US009270845B2

(12) **United States Patent**
Abe

(10) **Patent No.: US 9,270,845 B2**
(45) **Date of Patent: Feb. 23, 2016**

(54) INFORMATION PROCESSING APPARATUS, INFORMATION PROCESSING METHOD, AND PROGRAM

(75) Inventor: **Koichi Abe**, Yokohama (JP)

(73) Assignee: **CANON KABUSHIKI KAISHA**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 807 days.

(21) Appl. No.: **12/870,217**

(22) Filed: **Aug. 27, 2010**

(65) **Prior Publication Data**

US 2011/0051190 A1 Mar. 3, 2011

(30) **Foreign Application Priority Data**

Sep. 1, 2009 (JP) 2009-201853
Dec. 16, 2009 (JP) 2009-285354

(51) **Int. Cl.**
G06F 3/12 (2006.01)
H04N 1/00 (2006.01)
G06F 13/12 (2006.01)

(52) **U.S. Cl.**
CPC ***H04N 1/00204*** (2013.01); ***H04N 1/00244*** (2013.01); ***H04N 1/00427*** (2013.01); ***H04N 1/00464*** (2013.01); ***H04N 1/00474*** (2013.01); ***H04N 1/00482*** (2013.01); ***H04N 1/00503*** (2013.01); ***H04N 1/00962*** (2013.01); *H04N 2201/0039* (2013.01); *H04N 2201/0094* (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,106,472	B2 *	9/2006	Gomez et al.	358/1.15
2004/0136023	A1 *	7/2004	Sato	358/1.13
2005/0267797	A1 *	12/2005	Takahashi et al.	705/11
2005/0270551	A1 *	12/2005	Choi	358/1.13
2007/0268517	A1 *	11/2007	Koarai	358/1.15

FOREIGN PATENT DOCUMENTS

CN	1704893	A	12/2005
JP	2005-085132	A	3/2005

OTHER PUBLICATIONS

Office Action issued on May 17, 2013 in counterpart Chinese Application No. 201010272043.7.

* cited by examiner

Primary Examiner — Ashish K Thomas
Assistant Examiner — Neil R McLean
(74) *Attorney, Agent, or Firm* — Carter, DeLuca, Farrell & Schmidt, LLP

(57) **ABSTRACT**

An apparatus includes a management unit configured to manage a device that provides a plurality of functions, and a utilization unit configured to utilize one function among the plurality of functions. In the apparatus, the management unit confirms whether a function different from the one function, among the plurality of functions, is available according to management and control data that includes information for constructing a management screen, which management screen being a screen configured to manage the device, and a setting unit sets an argument to an object indicating a link to the utilization unit according to a result of the confirmation. In the apparatus, the utilization unit is configured, if the object, which is displayed on the management screen, is designated, to set the device according to the argument.

12 Claims, 26 Drawing Sheets

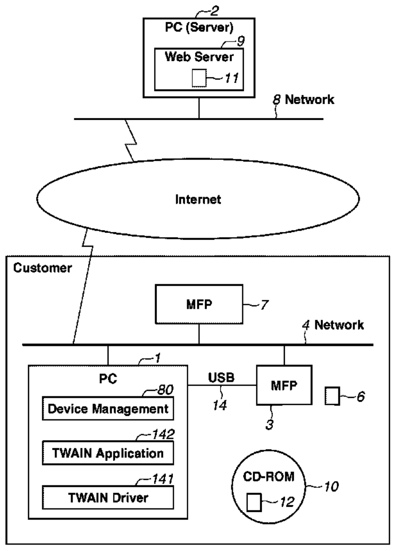


FIG.1

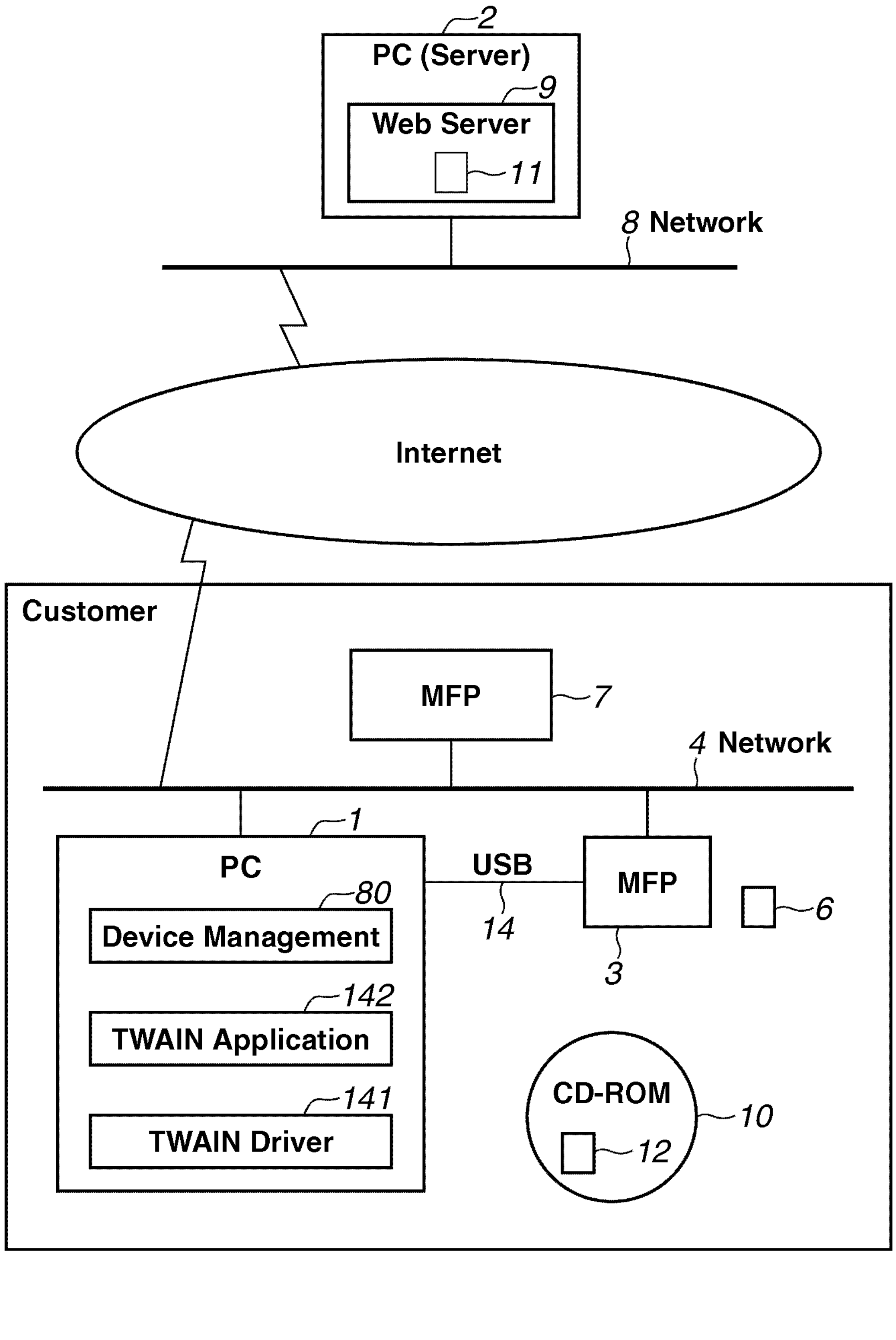

2
PC (Server)
9
Web Server
11
8 Network
Internet
Customer
MFP
7
4 Network
1
PC
80
Device Management
142
TWAIN Application
141
TWAIN Driver
USB
14
MFP
3
6
CD-ROM
10
12

FIG.2A

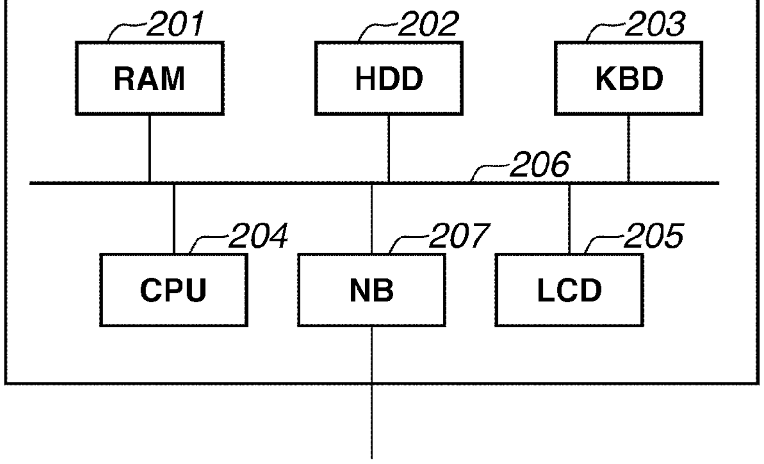

201
RAM
202
HDD
203
KBD
206
204
CPU
207
NB
205
LCD

FIG.2B

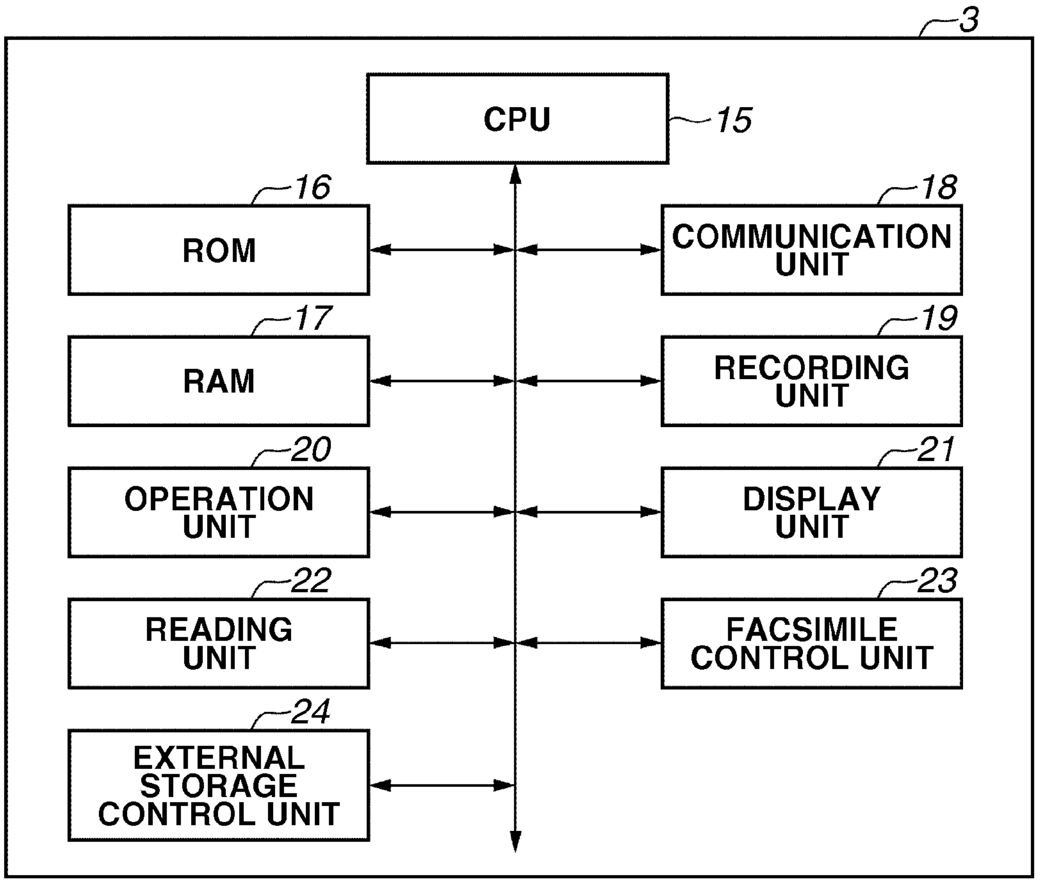
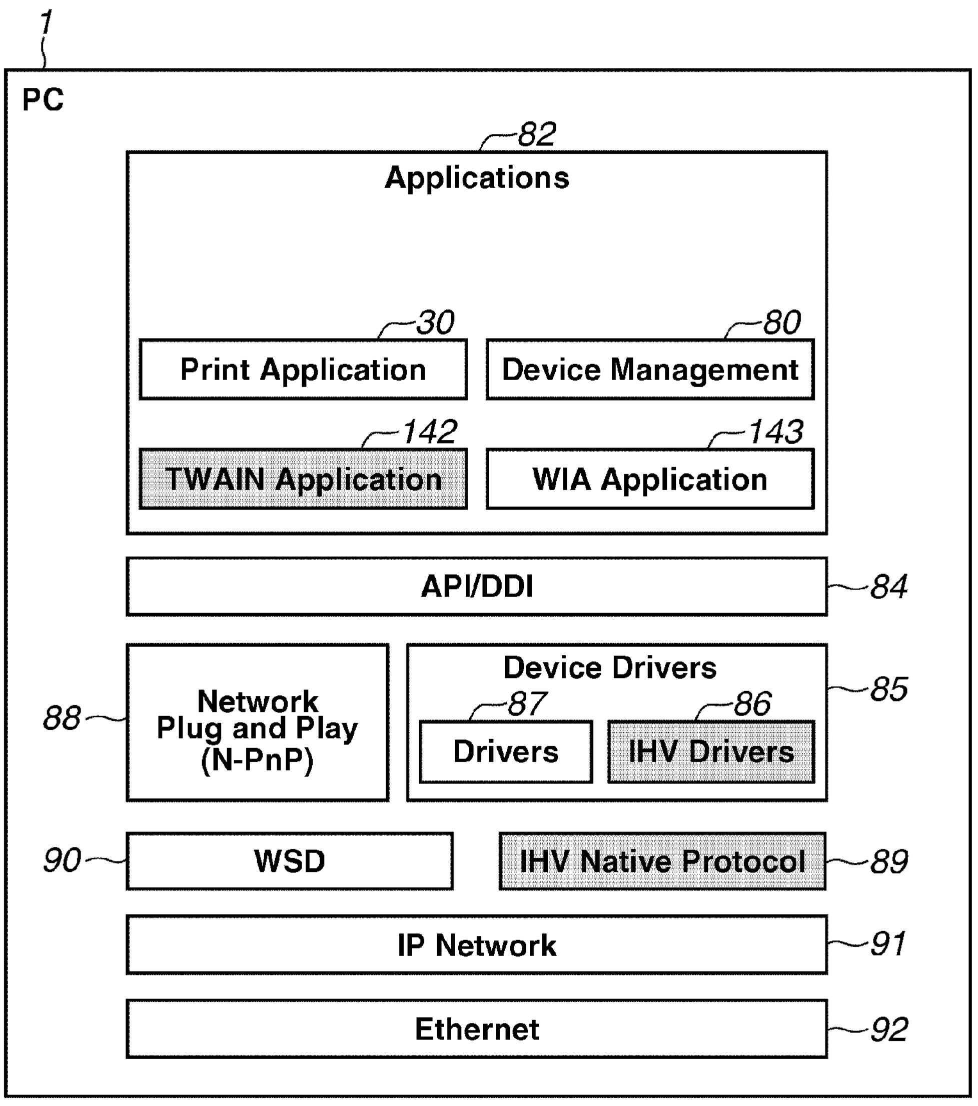

3
CPU
15
16
ROM
18
COMMUNICATION UNIT
17
RAM
19
RECORDING UNIT
20
OPERATION UNIT
21
DISPLAY UNIT
22
READING UNIT
23
FACSIMILE CONTROL UNIT
24
EXTERNAL STORAGE CONTROL UNIT

FIG.3



☐ ··· MODULE SUPPLIED TO OS AS STANDARD

▨ ··· MODULE MANUFACTURED BY IHV

FIG.4

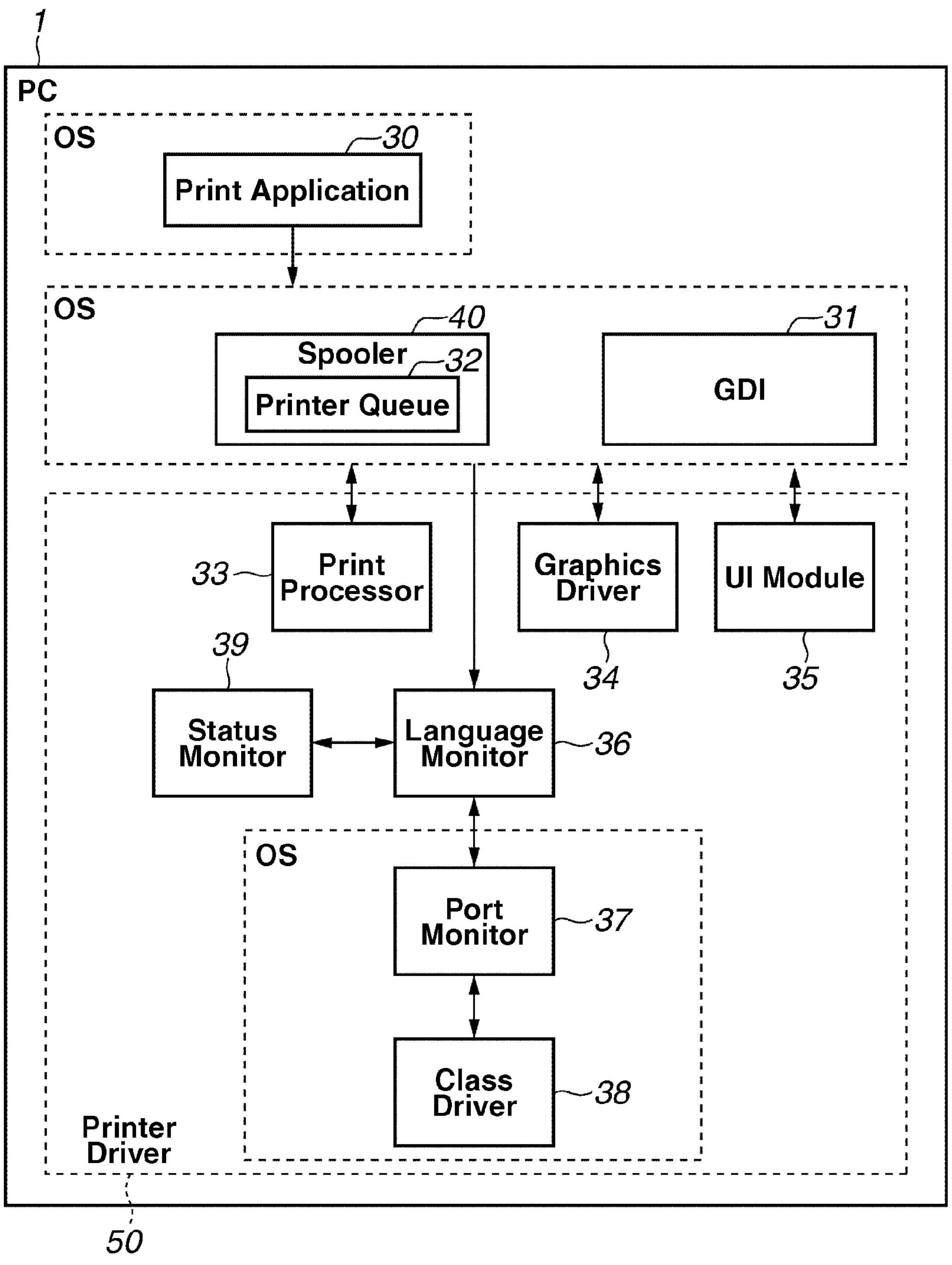

1
PC
OS
Print Application
30
OS
Spooler
40
Printer Queue
32
GDI
31
Print Processor
33
Graphics Driver
34
UI Module
35
Status Monitor
39
Language Monitor
36
OS
Port Monitor
37
Class Driver
38
Printer Driver
50

FIG.5A

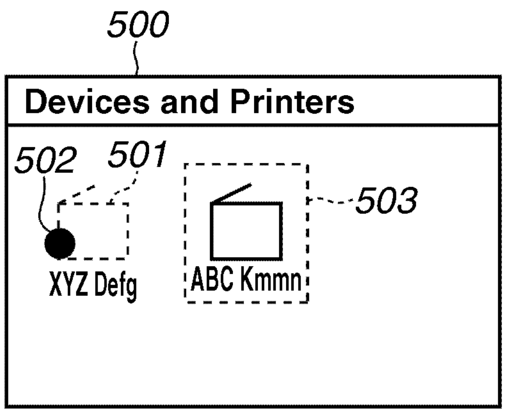

500
Devices and Printers
502
501
503
XYZ Defg
ABC Kmmn

FIG.5B

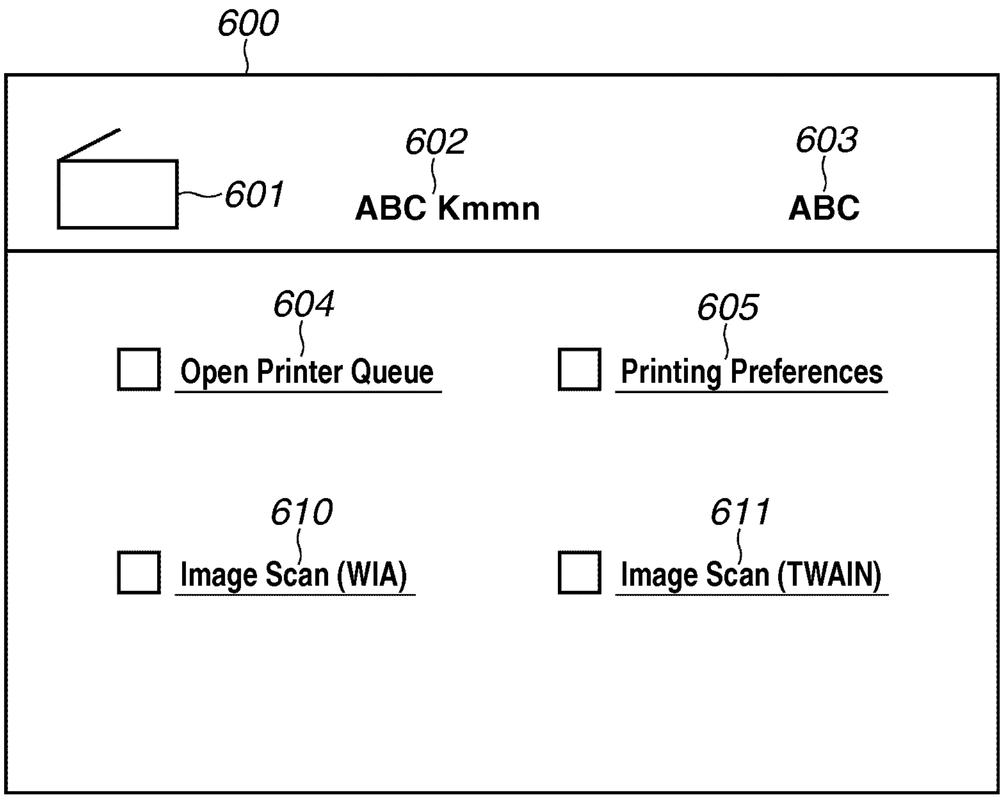
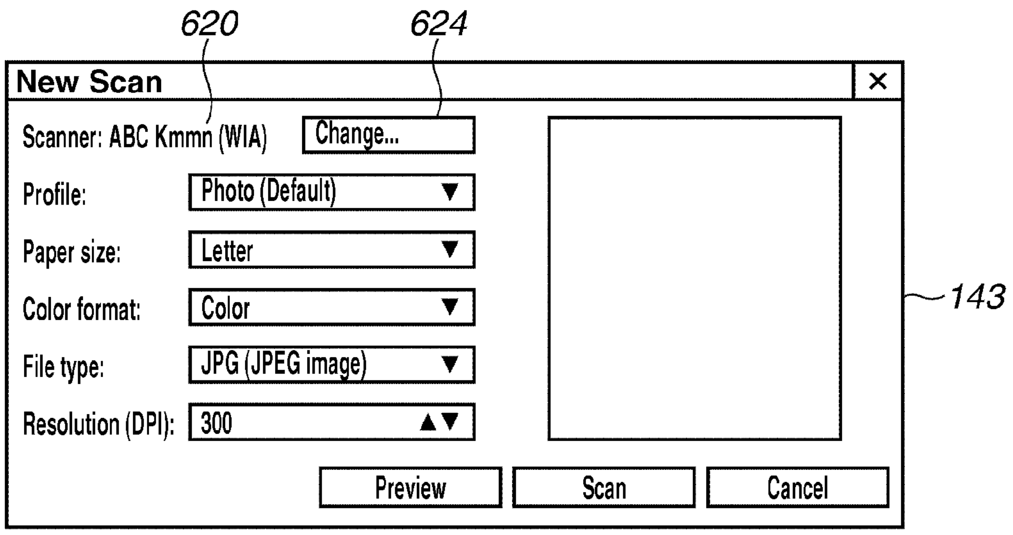
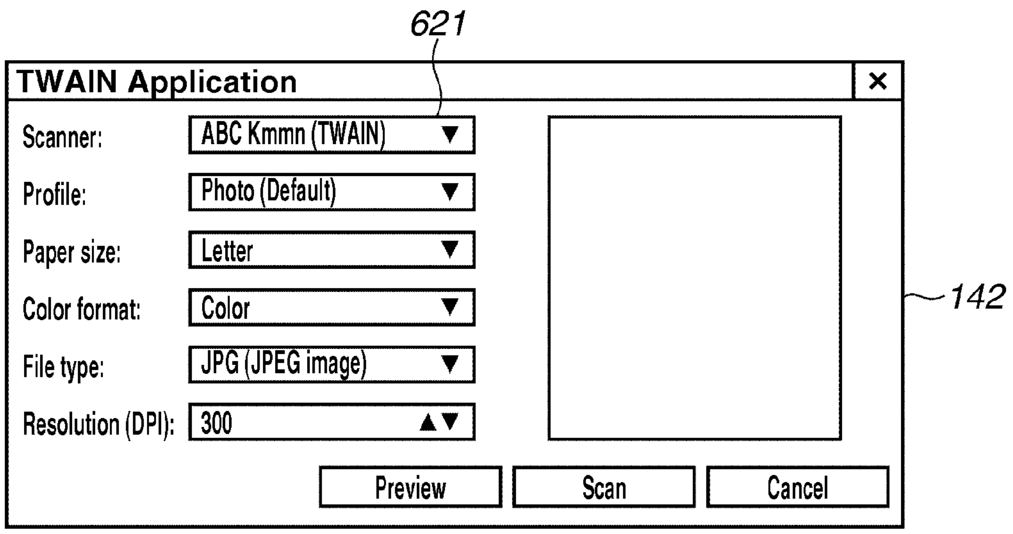

600
601
602
ABC Kmmn
603
ABC
604
Open Printer Queue
605
Printing Preferences
610
Image Scan (WIA)
611
Image Scan (TWAIN)

FIG.6A



Scanner: ABC Kmmn (WIA)
Profile: Photo (Default) ▼
Paper size: Letter ▼
Color format: Color ▼
File type: JPG (JPEG image) ▼
Resolution (DPI): 300 ▲▼

FIG.6B



Scanner: ABC Kmmn (TWAIN) ▼
Profile: Photo (Default) ▼
Paper size: Letter ▼
Color format: Color ▼
File type: JPG (JPEG image) ▼
Resolution (DPI): 300 ▲▼

FIG.6C

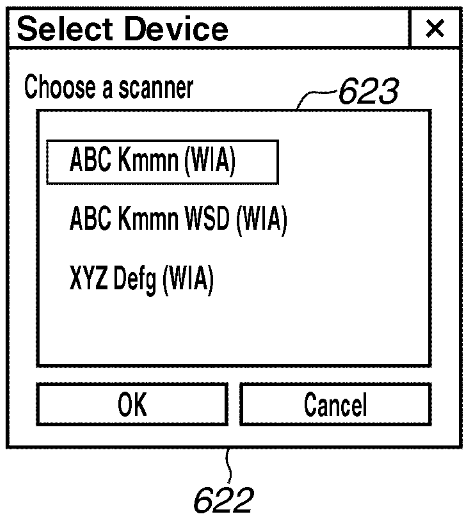

Select Device
×
Choose a scanner
623
ABC Kmmn (WIA)
ABC Kmmn WSD (WIA)
XYZ Defg (WIA)
OK
Cancel
622

FIG.6D

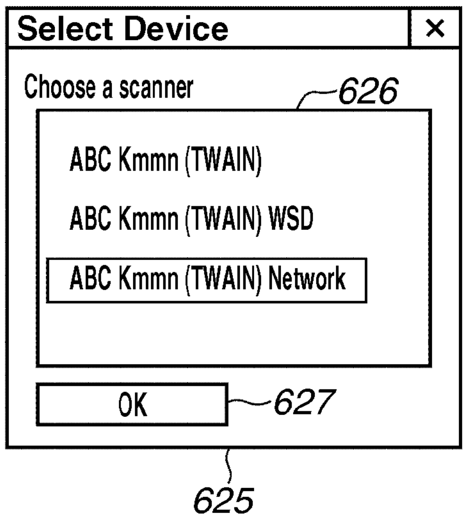

Select Device
×
Choose a scanner
626
ABC Kmmn (TWAIN)
ABC Kmmn (TWAIN) WSD
ABC Kmmn (TWAIN) Network
OK
627
625

FIG.7A

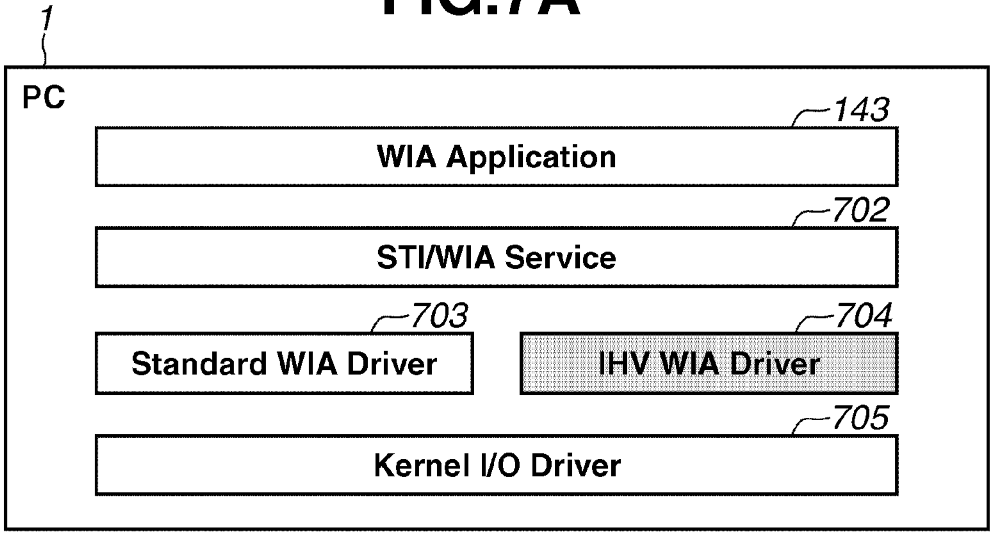
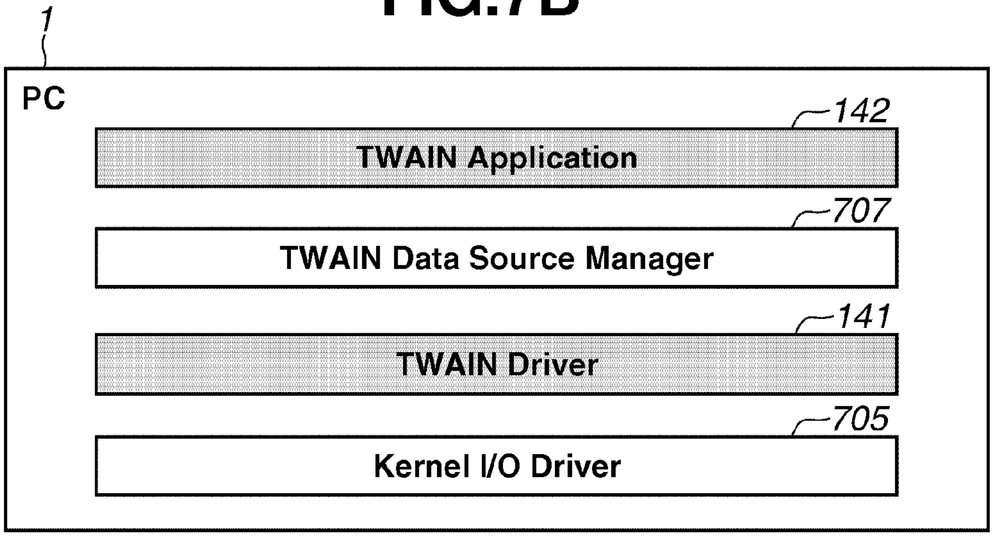


FIG.7B



☐ ··· MODULE SUPPLIED TO OS AS STANDARD

▨ ··· MODULE MANUFACTURED BY IHV

FIG.8

800

```
<?xml version="1.0" encoding="utf-8"?>
</dm:deviceManagement xmlns:dm="http://abc.xxx/dm/control">
    <dm:manufacturer>ABC</dm:manufacturer> ~801
    <dm:model>Kmmn</dm:model> ~802
    <dm:functions> ~803
        <dm:function> ~804
            <dm:name xml:lang="en-US">Open Printer Queue</dm:name> ~805
            <dm:execute>openPrinterQueue</dm:execute> ~806
        </dm:function>
        <dm:function> ~839
            <dm:name xml:lang="en-US">Printing Preferences</dm:name> ~807
            <dm:execute>printingPreferences</dm:execute> ~808
        </dm:function>
        <dm:function> ~840
            <!-- CASE WHERE IMAGE CAN BE READ VIA USB BY USING
                WIA DRIVER OR VIA NETWORK CONNECTION BY WSD -->
            <dm:name xml:lang="en-US">Image Scan (WIA)</dm:name> ~809
            <dm:required> ~810
                <dm:device>scanner</dm:device> ~811
                <dm:available>true</dm:available> ~812
            </dm:required>
            <dm:execute>wiaScan</dm:execute> ~813
        </dm:function>
        <dm:function> ~841
            <!-- CASE WHERE IMAGE CAN BE READ BY TWAIN DRIVER VIA USB CONNECTION -->
            <dm:name xml:lang="en-US">Image Scan (TWAIN)</dm:name> ~814
            <dm:required> ~845
                <dm:device>storage</dm:device> ~815
                <dm:available>true</dm:available> ~816
            </dm:required>
            <dm:execute>TWAINScan.exe" ABC Kmmn (TWAIN)" /devmng</dm:execute> ~817
        </dm:function>
        <dm:function> ~842
            <!-- CASE WHERE IMAGE CANNOT BE READ BY TWAIN DRIVER VIA USB CONNECTION -->
            <dm:name xml:lang="en-US">Image Scan (TWAIN) - Select Device</dm:name> ~818
            <dm:required> ~846
                <dm:device>storage</dm:device> ~819
                <dm:available>false</dm:available> ~820
            </dm:required>
            <dm:execute>TWAINScan.exe" " /devmng</dm:execute> ~821
        </dm:function>
        <dm:function> ~843
            <!-- CASE WHERE IMAGE CAN BE READ BY TWAIN DRIVER VIA WSD NETWORK CONNECTION BY -->
            <dm:name xml:lang="en-US">Image Scan (TWAIN)</dm:name> ~822
            <dm:required> ~847
                <dm:device>printer</dm:device> ~823
                <dm:available>true</dm:available> ~824
                <dm:port>WSD</dm:port> ~825
            </dm:required>
            <dm:execute>TWAINScan.exe" ABC Kmmn (TWAIN) WSD" /devmng</dm:execute> ~826
        </dm:function>
```

FIG.9

800

```
        <dm:function>~844
            <!-- CASE WHERE IMAGE CAN BE READ BY TWAIN DRIVER VIA CONNECTION BY
                IHV NATIVE PROTOCOL -->
            <dm:name xml:lang="en-US">Image Scan (TWAIN)</dm:name>~827
            <dm:required>~848
                <dm:device>printer</dm:device>~828
                <dm:available>true</dm:available>~829
                <dm:port invert="yes">LPT</dm:port>~830
                <dm:port invert="yes">COM</dm:port>~831
                <dm:port invert="yes">FILE</dm:port>~832
                <dm:port invert="yes">IR</dm:port>~833
                <dm:port invert="yes">XPS</dm:port>~834
                <dm:port invert="yes">BTH</dm:port>~835
                <dm:port invert="yes">USB</dm:port>~836
                <dm:port invert="yes">WSD</dm:port>~837
            </dm:required>
            <dm:execute>TWAINScan.exe" ABC Kmmn (TWAIN) Network" /devmng</dm:execute>~838
        </dm:function>
    </dm:functions>
</dm:deviceManagement>
```

U.S. Patent   Feb. 23, 2016   Sheet 11 of 26   US 9,270,845 B2

FIG.10

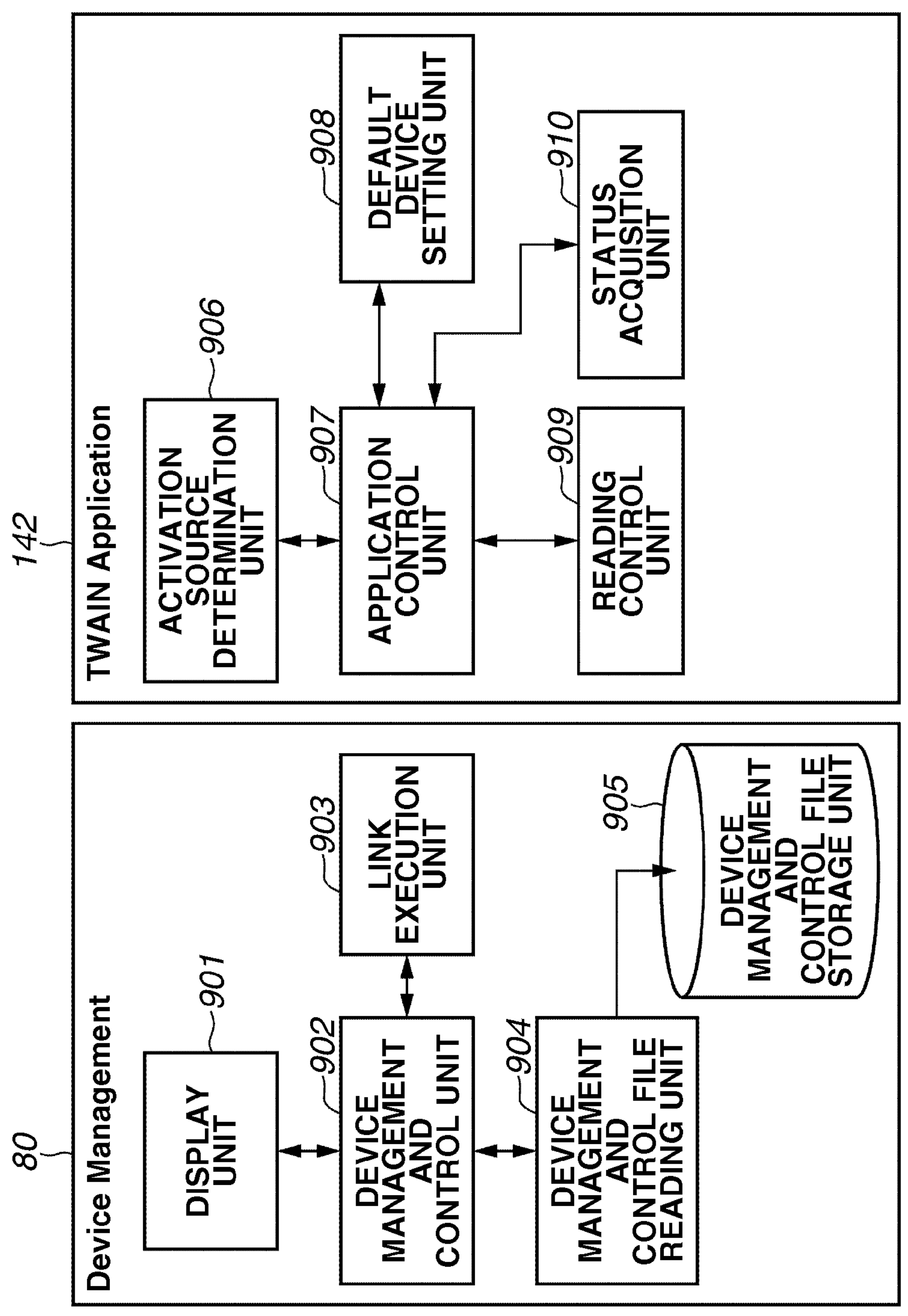

80
Device Management
901
DISPLAY UNIT
902
DEVICE MANAGEMENT AND CONTROL UNIT
903
LINK EXECUTION UNIT
904
DEVICE MANAGEMENT AND CONTROL FILE READING UNIT
905
DEVICE MANAGEMENT AND CONTROL FILE STORAGE UNIT
142
TWAIN Application
906
ACTIVATION SOURCE DETERMINATION UNIT
907
APPLICATION CONTROL UNIT
908
DEFAULT DEVICE SETTING UNIT
909
READING CONTROL UNIT
910
STATUS ACQUISITION UNIT

FIG.11

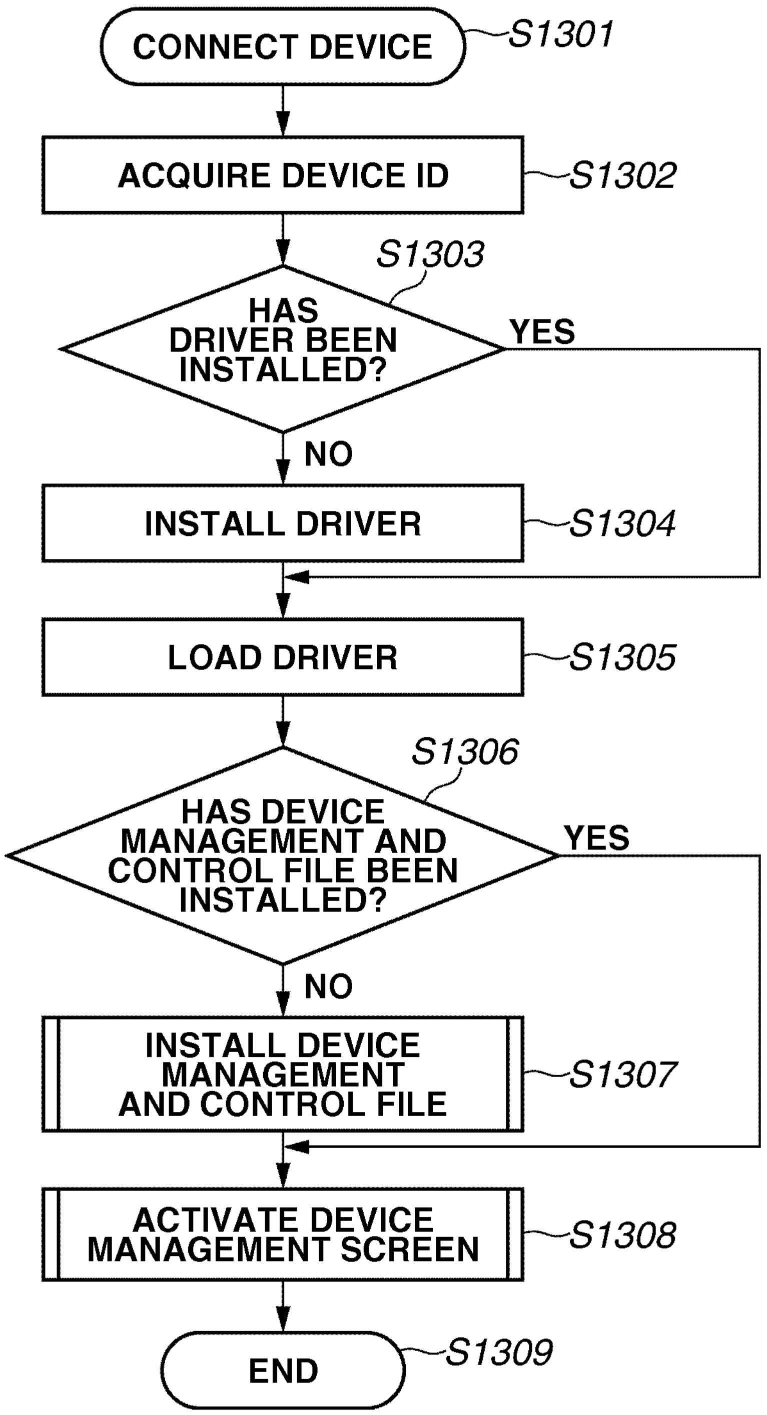

CONNECT DEVICE
S1301
ACQUIRE DEVICE ID
S1302
S1303
HAS DRIVER BEEN INSTALLED?
YES
NO
INSTALL DRIVER
S1304
LOAD DRIVER
S1305
S1306
HAS DEVICE MANAGEMENT AND CONTROL FILE BEEN INSTALLED?
YES
NO
INSTALL DEVICE MANAGEMENT AND CONTROL FILE
S1307
ACTIVATE DEVICE MANAGEMENT SCREEN
S1308
END
S1309

FIG.12

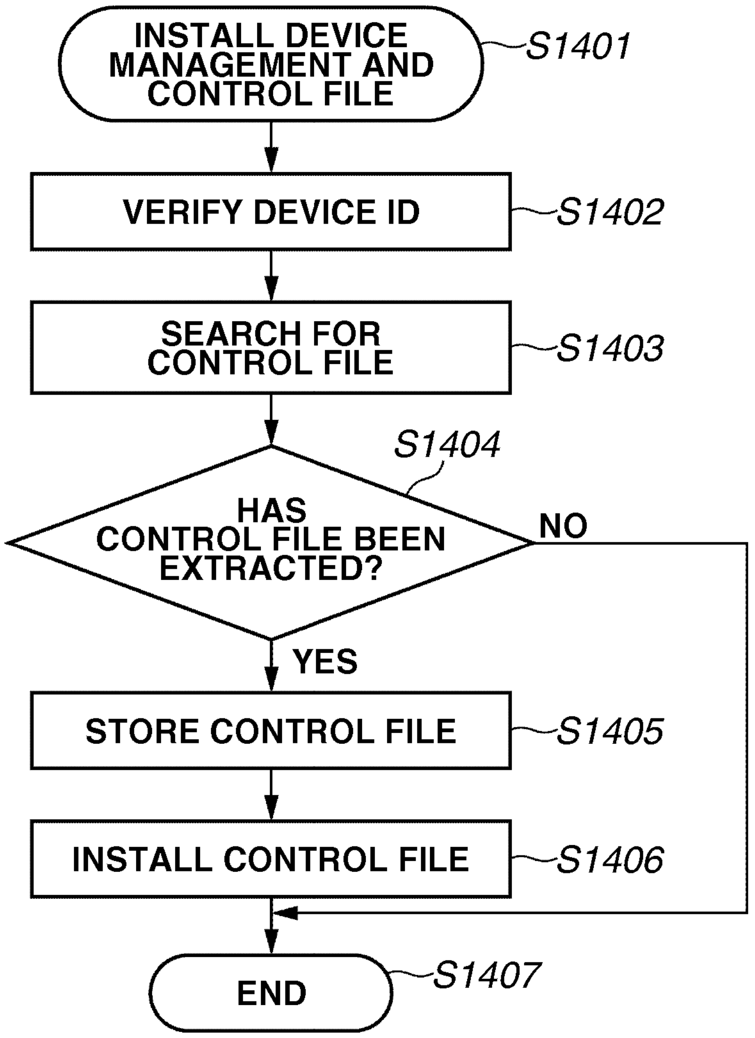

INSTALL DEVICE MANAGEMENT AND CONTROL FILE
S1401
VERIFY DEVICE ID
S1402
SEARCH FOR CONTROL FILE
S1403
S1404
HAS CONTROL FILE BEEN EXTRACTED?
NO
YES
STORE CONTROL FILE
S1405
INSTALL CONTROL FILE
S1406
END
S1407

FIG.13

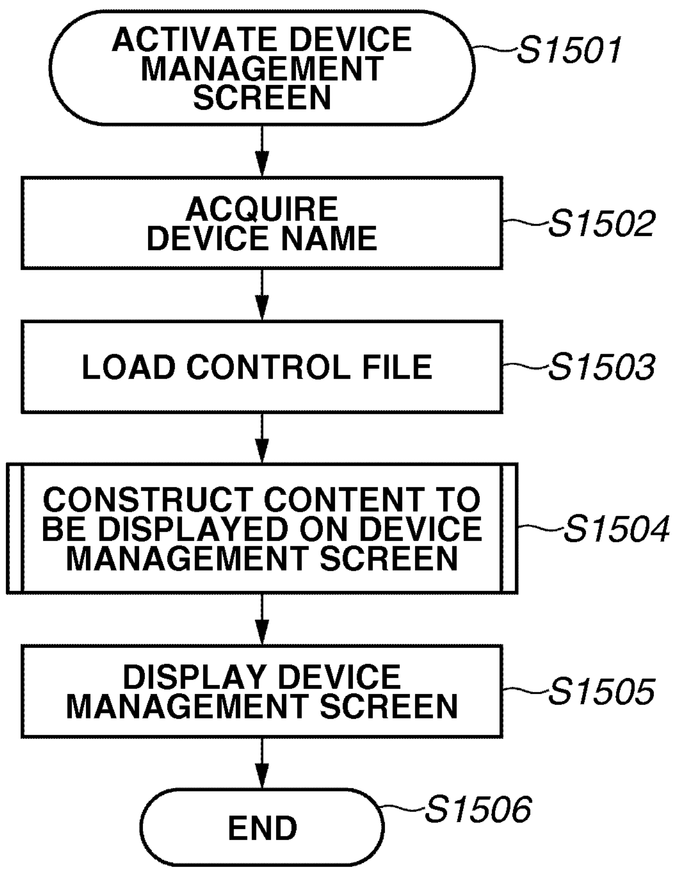

ACTIVATE DEVICE MANAGEMENT SCREEN
S1501
ACQUIRE DEVICE NAME
S1502
LOAD CONTROL FILE
S1503
CONSTRUCT CONTENT TO BE DISPLAYED ON DEVICE MANAGEMENT SCREEN
S1504
DISPLAY DEVICE MANAGEMENT SCREEN
S1505
END
S1506

FIG.14

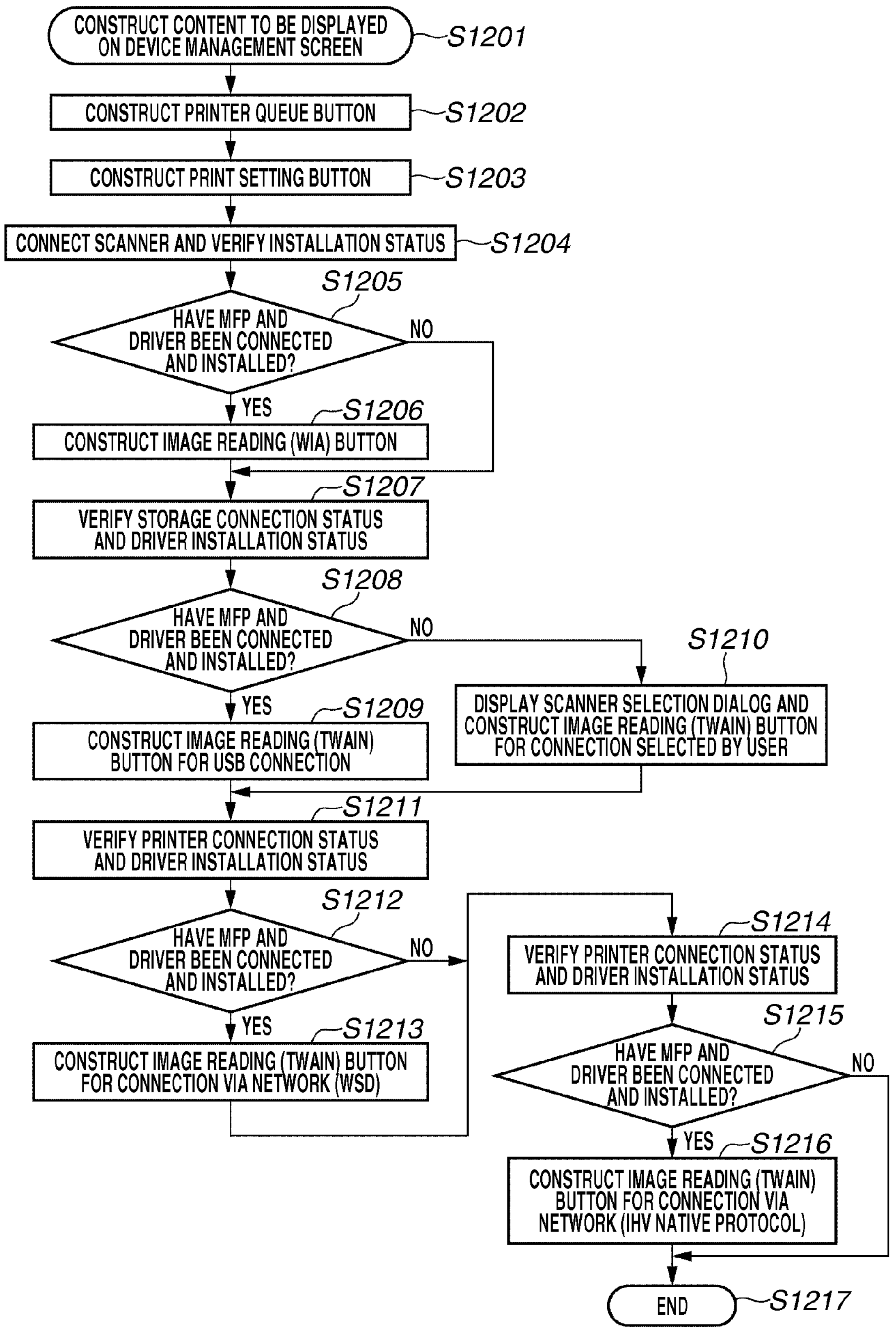

CONSTRUCT CONTENT TO BE DISPLAYED ON DEVICE MANAGEMENT SCREEN
S1201
CONSTRUCT PRINTER QUEUE BUTTON
S1202
CONSTRUCT PRINT SETTING BUTTON
S1203
CONNECT SCANNER AND VERIFY INSTALLATION STATUS
S1204
S1205
HAVE MFP AND DRIVER BEEN CONNECTED AND INSTALLED?
NO
YES
S1206
CONSTRUCT IMAGE READING (WIA) BUTTON
S1207
VERIFY STORAGE CONNECTION STATUS AND DRIVER INSTALLATION STATUS
S1208
HAVE MFP AND DRIVER BEEN CONNECTED AND INSTALLED?
NO
S1210
DISPLAY SCANNER SELECTION DIALOG AND CONSTRUCT IMAGE READING (TWAIN) BUTTON FOR CONNECTION SELECTED BY USER
YES
S1209
CONSTRUCT IMAGE READING (TWAIN) BUTTON FOR USB CONNECTION
S1211
VERIFY PRINTER CONNECTION STATUS AND DRIVER INSTALLATION STATUS
S1212
HAVE MFP AND DRIVER BEEN CONNECTED AND INSTALLED?
NO
S1214
VERIFY PRINTER CONNECTION STATUS AND DRIVER INSTALLATION STATUS
YES
S1213
CONSTRUCT IMAGE READING (TWAIN) BUTTON FOR CONNECTION VIA NETWORK (WSD)
S1215
HAVE MFP AND DRIVER BEEN CONNECTED AND INSTALLED?
NO
YES
S1216
CONSTRUCT IMAGE READING (TWAIN) BUTTON FOR CONNECTION VIA NETWORK (IHV NATIVE PROTOCOL)
END
S1217

FIG.15

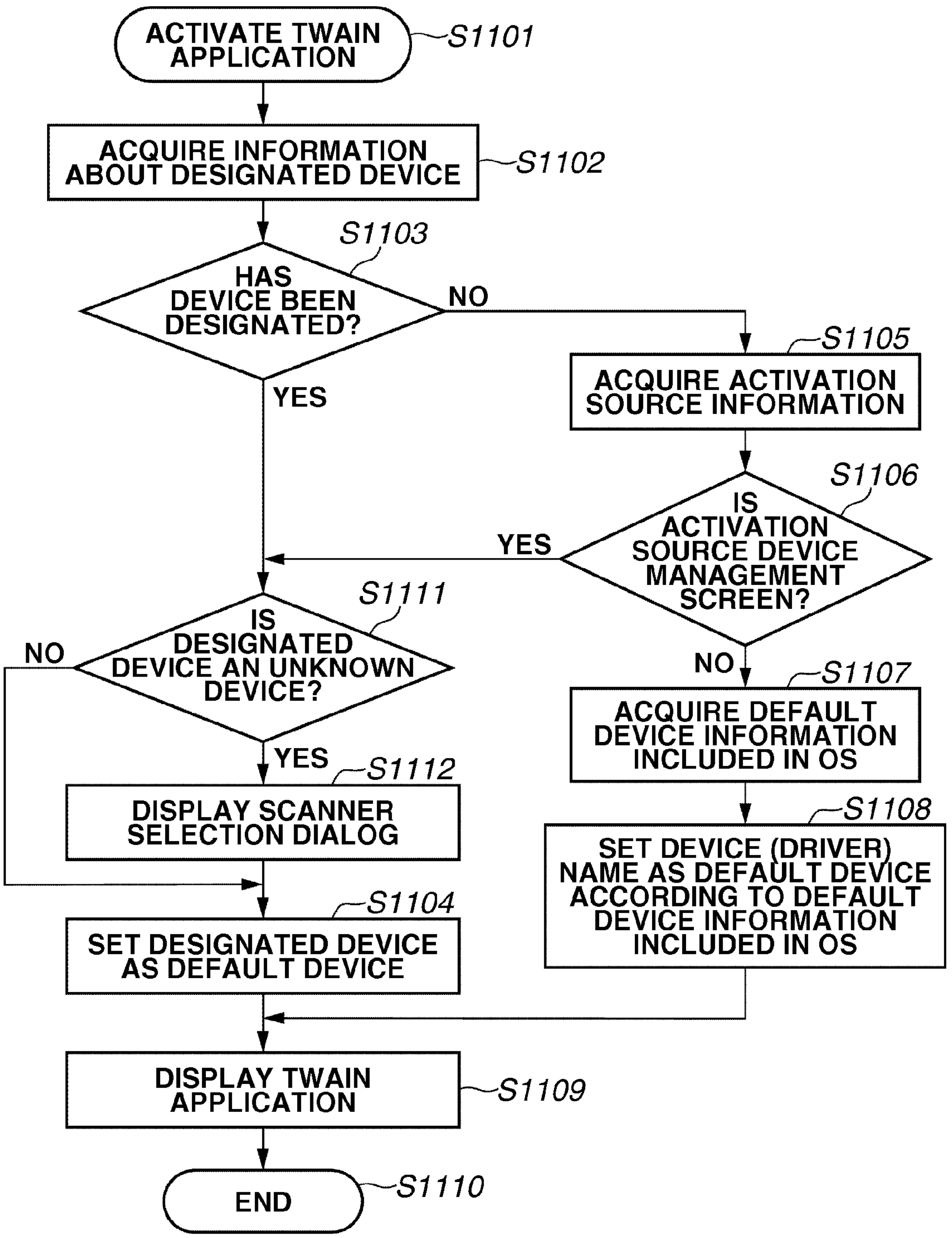

ACTIVATE TWAIN APPLICATION
S1101
ACQUIRE INFORMATION ABOUT DESIGNATED DEVICE
S1102
S1103
HAS DEVICE BEEN DESIGNATED?
NO
YES
S1105
ACQUIRE ACTIVATION SOURCE INFORMATION
S1106
IS ACTIVATION SOURCE DEVICE MANAGEMENT SCREEN?
YES
NO
S1111
IS DESIGNATED DEVICE AN UNKNOWN DEVICE?
NO
YES
S1112
DISPLAY SCANNER SELECTION DIALOG
S1107
ACQUIRE DEFAULT DEVICE INFORMATION INCLUDED IN OS
S1108
SET DEVICE (DRIVER) NAME AS DEFAULT DEVICE ACCORDING TO DEFAULT DEVICE INFORMATION INCLUDED IN OS
S1104
SET DESIGNATED DEVICE AS DEFAULT DEVICE
DISPLAY TWAIN APPLICATION
S1109
END
S1110

FIG.16A

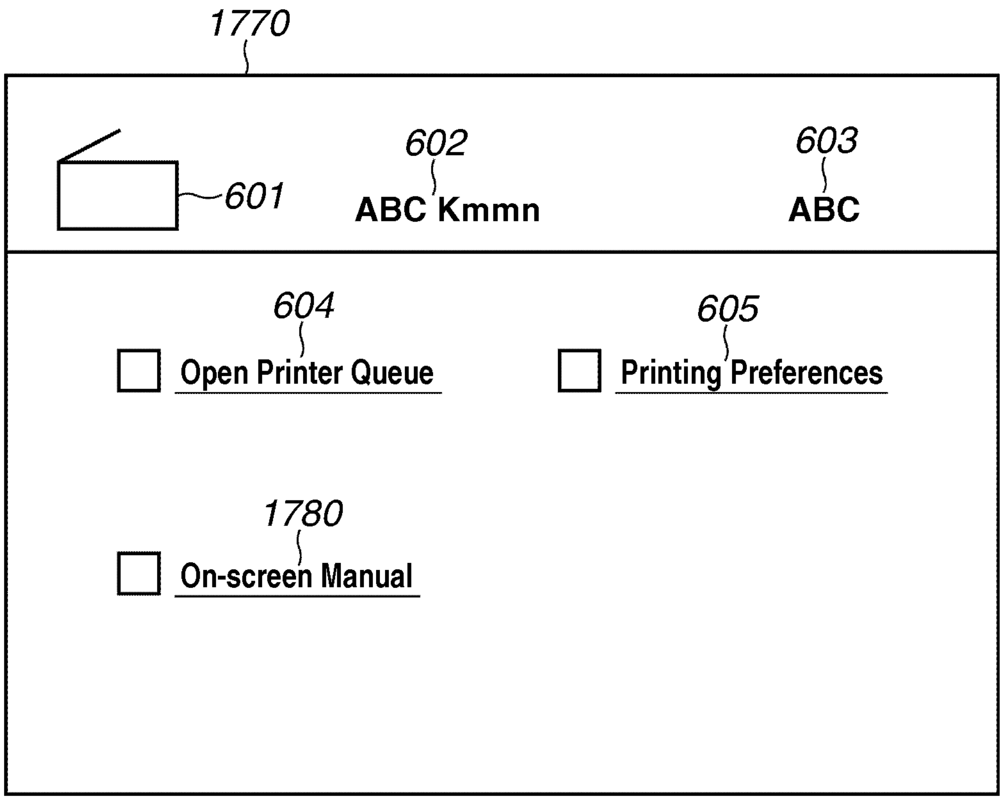


FIG.16B

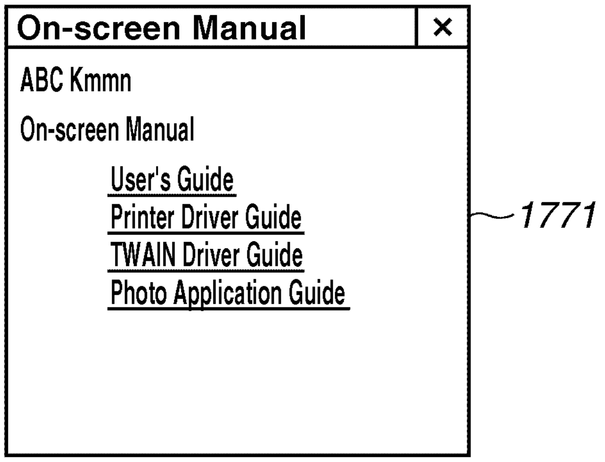
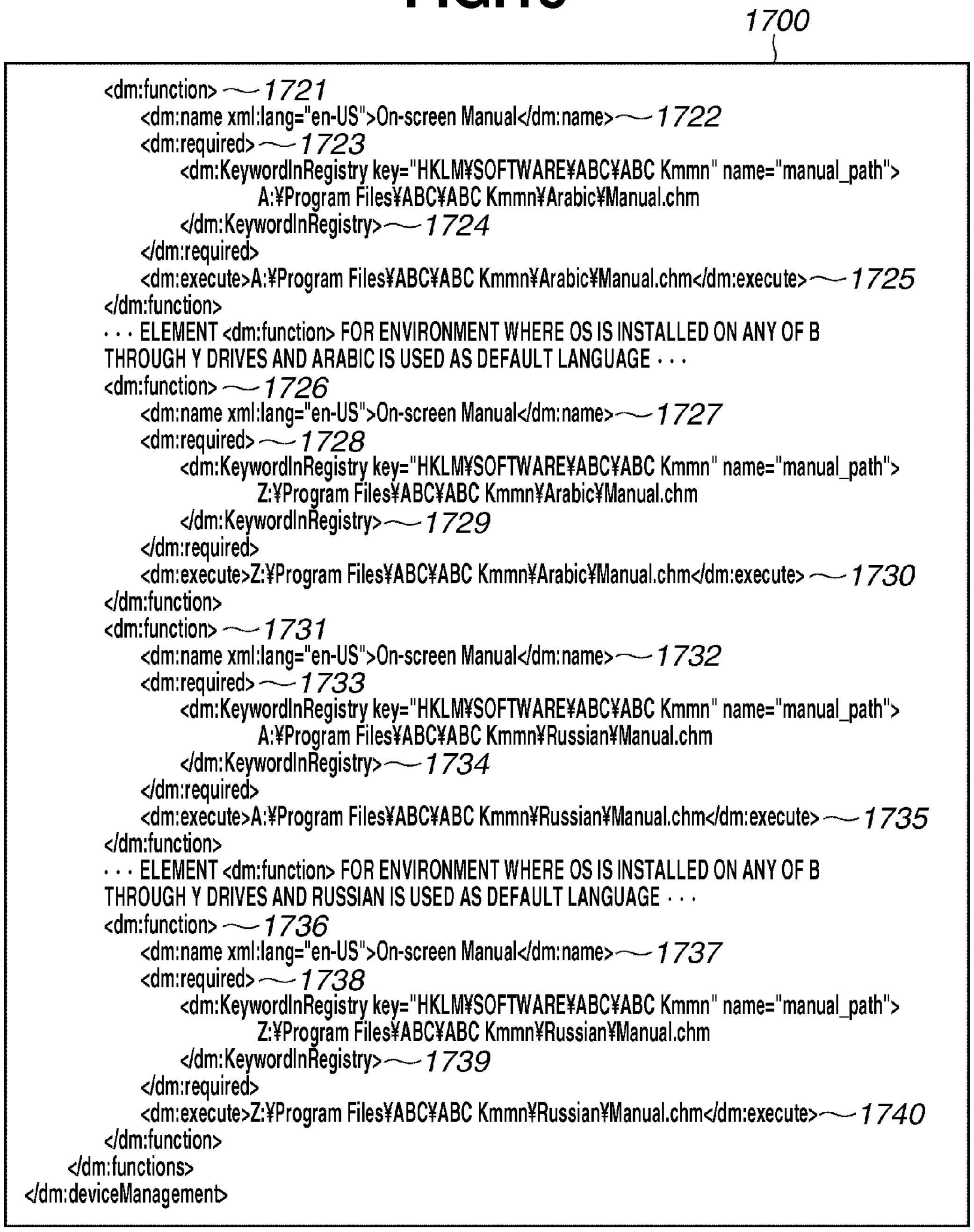


FIG.17

1700

```
<?xml version="1.0" encoding="utf-8"?>
</dm:deviceManagement xmlns:dm="http://abc.xxx/dm/control">
    <dm:manufacturer>ABC</dm:manufacturer> ~ 801
    <dm:model>Kmmn</dm:model> ~ 802
    <dm:functions> ~ 1781
        <dm:function> ・・・ </dm:function> ~ 804
        <dm:function> ・・・ </dm:function> ~ 839
        <dm:function> ~ 1701
            <dm:name xml:lang="en-US">On-screen Manual</dm:name> ~ 1702
            <dm:required> ~ 1703
                <dm:KeywordInRegistry key="HKLM¥SOFTWARE¥ABC¥ABC Kmmn" name="manual_path">
                        A:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
                </dm:KeywordInRegistry> ~ 1704
            </dm:required>
            <dm:execute>A:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm</dm:execute> ~ 1705
        </dm:function>
        <dm:function> ~ 1706
            <dm:name xml:lang="en-US">On-screen Manual</dm:name> ~ 1707
            <dm:required> ~ 1708
                <dm:KeywordInRegistry key="HKLM¥SOFTWARE¥ABC¥ABC Kmmn" name="manual_path">
                        B:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
                </dm:KeywordInRegistry> ~ 1709
            </dm:required>
            <dm:execute>B:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm</dm:execute> ~ 1710
        </dm:function>
        ・・・ ELEMENT <dm:function> FOR ENVIRONMENT WHERE OS IS INSTALLED ON ANY OF C
        THROUGH X DRIVES AND ENGLISH IS USED AS DEFAULT LANGUAGE ・・・
        <dm:function> ~ 1711
            <dm:name xml:lang="en-US">On-screen Manual</dm:name> ~ 1712
            <dm:required> ~ 1713
                <dm:KeywordInRegistry key="HKLM¥SOFTWARE¥ABC¥ABC Kmmn" name="manual_path">
                        Y:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
                </dm:KeywordInRegistry> ~ 1714
            </dm:required>
            <dm:execute>Y:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm</dm:execute> ~ 1715
        </dm:function>
        <dm:function> ~ 1716
            <dm:name xml:lang="en-US">On-screen Manual</dm:name> ~ 1717
            <dm:required> ~ 1718
                <dm:KeywordInRegistry key="HKLM¥SOFTWARE¥ABC¥ABC Kmmn" name="manual_path">
                        Z:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
                </dm:KeywordInRegistry> ~ 1719
            </dm:required>
            <dm:execute>Z:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm</dm:execute> ~ 1720
        </dm:function>
```

FIG.18



```
          <dm:function> ~ 1721
               <dm:name xml:lang="en-US">On-screen Manual</dm:name> ~ 1722
               <dm:required> ~ 1723
                    <dm:KeywordInRegistry key="HKLM¥SOFTWARE¥ABC¥ABC Kmmn" name="manual_path">
                              A:¥Program Files¥ABC¥ABC Kmmn¥Arabic¥Manual.chm
                    </dm:KeywordInRegistry> ~ 1724
               </dm:required>
               <dm:execute>A:¥Program Files¥ABC¥ABC Kmmn¥Arabic¥Manual.chm</dm:execute> ~ 1725
          </dm:function>
          · · · ELEMENT <dm:function> FOR ENVIRONMENT WHERE OS IS INSTALLED ON ANY OF B
          THROUGH Y DRIVES AND ARABIC IS USED AS DEFAULT LANGUAGE · · ·
          <dm:function> ~ 1726
               <dm:name xml:lang="en-US">On-screen Manual</dm:name> ~ 1727
               <dm:required> ~ 1728
                    <dm:KeywordInRegistry key="HKLM¥SOFTWARE¥ABC¥ABC Kmmn" name="manual_path">
                              Z:¥Program Files¥ABC¥ABC Kmmn¥Arabic¥Manual.chm
                    </dm:KeywordInRegistry> ~ 1729
               </dm:required>
               <dm:execute>Z:¥Program Files¥ABC¥ABC Kmmn¥Arabic¥Manual.chm</dm:execute> ~ 1730
          </dm:function>
          <dm:function> ~ 1731
               <dm:name xml:lang="en-US">On-screen Manual</dm:name> ~ 1732
               <dm:required> ~ 1733
                    <dm:KeywordInRegistry key="HKLM¥SOFTWARE¥ABC¥ABC Kmmn" name="manual_path">
                              A:¥Program Files¥ABC¥ABC Kmmn¥Russian¥Manual.chm
                    </dm:KeywordInRegistry> ~ 1734
               </dm:required>
               <dm:execute>A:¥Program Files¥ABC¥ABC Kmmn¥Russian¥Manual.chm</dm:execute> ~ 1735
          </dm:function>
          · · · ELEMENT <dm:function> FOR ENVIRONMENT WHERE OS IS INSTALLED ON ANY OF B
          THROUGH Y DRIVES AND RUSSIAN IS USED AS DEFAULT LANGUAGE · · ·
          <dm:function> ~ 1736
               <dm:name xml:lang="en-US">On-screen Manual</dm:name> ~ 1737
               <dm:required> ~ 1738
                    <dm:KeywordInRegistry key="HKLM¥SOFTWARE¥ABC¥ABC Kmmn" name="manual_path">
                              Z:¥Program Files¥ABC¥ABC Kmmn¥Russian¥Manual.chm
                    </dm:KeywordInRegistry> ~ 1739
               </dm:required>
               <dm:execute>Z:¥Program Files¥ABC¥ABC Kmmn¥Russian¥Manual.chm</dm:execute> ~ 1740
          </dm:function>
     </dm:functions>
</dm:deviceManagement>
```

FIG.19

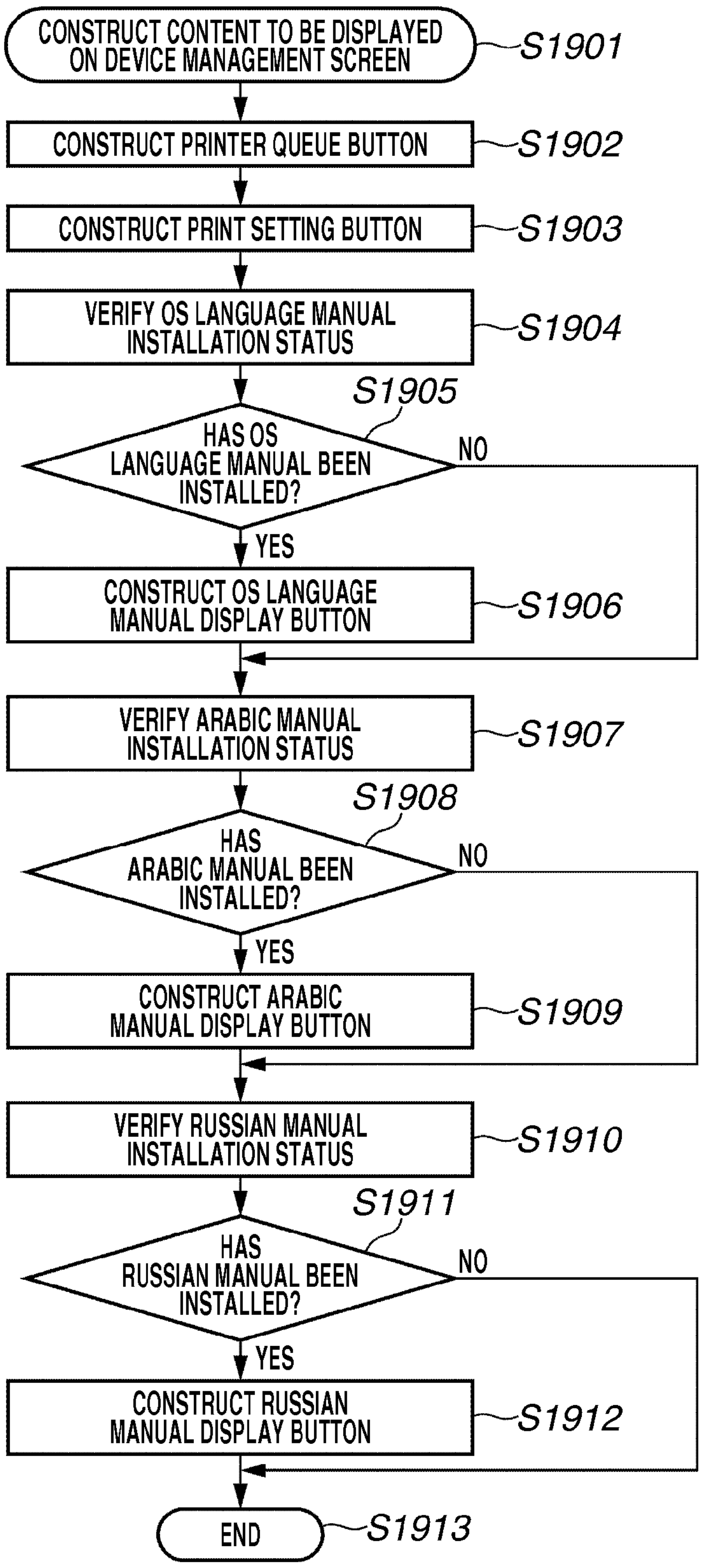

CONSTRUCT CONTENT TO BE DISPLAYED ON DEVICE MANAGEMENT SCREEN
S1901
CONSTRUCT PRINTER QUEUE BUTTON
S1902
CONSTRUCT PRINT SETTING BUTTON
S1903
VERIFY OS LANGUAGE MANUAL INSTALLATION STATUS
S1904
S1905
HAS OS LANGUAGE MANUAL BEEN INSTALLED?
NO
YES
CONSTRUCT OS LANGUAGE MANUAL DISPLAY BUTTON
S1906
VERIFY ARABIC MANUAL INSTALLATION STATUS
S1907
S1908
HAS ARABIC MANUAL BEEN INSTALLED?
NO
YES
CONSTRUCT ARABIC MANUAL DISPLAY BUTTON
S1909
VERIFY RUSSIAN MANUAL INSTALLATION STATUS
S1910
S1911
HAS RUSSIAN MANUAL BEEN INSTALLED?
NO
YES
CONSTRUCT RUSSIAN MANUAL DISPLAY BUTTON
S1912
END
S1913

FIG.20

950

```
<?xml version="1.0" encoding="utf-8"?>
</dm:deviceManagement xmlns:dm="http://abc.xxx/dm/control">
    <dm:manufacturer>ABC</dm:manufacturer> ~801
    <dm:model>Kmmn</dm:model> ~802
    <dm:functions> ~803
        <dm:function> ~804
            ··· SAME AS DESCRIPTION ILLUSTRATED IN FIG. 8 ···
        </dm:function>
        <dm:function> ~839
            ··· SAME AS DESCRIPTION ILLUSTRATED IN FIG. 8 ···
        </dm:function>
        <dm:function> ~840
            ··· SAME AS DESCRIPTION ILLUSTRATED IN FIG. 8 ···
        </dm:function>
        <dm:function> ~951
            <!-- CASE WHERE IMAGE CAN BE READ BY TWAIN DRIVER VIA USB CONNECTION -->
            <dm:name xml:lang="en-US">Image Scan (TWAIN)</dm:name> ~952
            <dm:required> ~953
                <dm:KeywordInRegistry key="HKCU¥Software¥ABC¥Network Utility¥Kmmn" name="active"
                        option="equal"></dm:KeywordInRegistry> ~954
            </dm:required>
            <dm:execute>TWAINScan.exe" ABC Kmmn (TWAIN)" /devmng</dm:execute> ~955
        </dm:function>
        <dm:function> ~956
            <!-- CASE WHERE IMAGE CANNOT BE READ BY TWAIN DRIVER VIA USB CONNECTION -->
            <dm:name xml:lang="en-US">Image Scan (TWAIN) - Select Device</dm:name> ~957
            <dm:required> ~958
                <dm:KeywordInRegistry key="HKCU¥Software¥ABC¥Network Utility¥Kmmn" name="active"
                        option="equal">0</dm:KeywordInRegistry> ~959
            </dm:required>
            <dm:execute>TWAINScan.exe" " /devmng</dm:execute> ~960
        </dm:function>
        <dm:function> ~961
            <!-- CASE WHERE IMAGE CAN BE READ BY TWAIN DRIVER VIA CONNECTION BY
                IHV NATIVE PROTOCOL -->
            <dm:name xml:lang="en-US">Image Scan (TWAIN)</dm:name> ~962
            <dm:required> ~963
                <dm:KeywordInRegistry key="HKCU¥Software¥ABC¥Network Utility¥Kmmn" name="active"
                        option="greater">0</dm:KeywordInRegistry> ~964
            </dm:required>
            <dm:execute>TWAINScan.exe" ABC Kmmn (TWAIN) Network" /devmng</dm:execute> ~965
        </dm:function>
    </dm:functions>
</dm:deviceManagement>
```

FIG.21

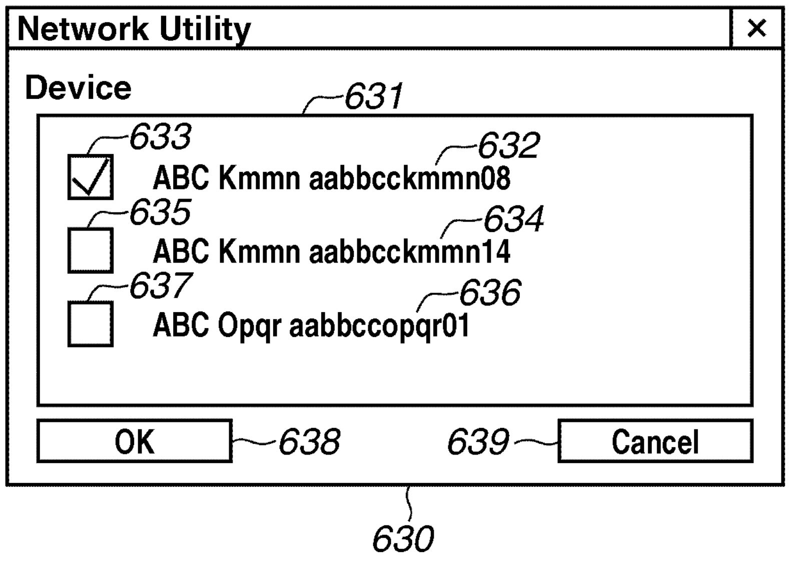

Network Utility
×
Device
631
633
632
ABC Kmmn aabbcckmmn08
635
634
ABC Kmmn aabbcckmmn14
637
636
ABC Opqr aabbccopqr01
OK
638
639
Cancel
630

FIG.22

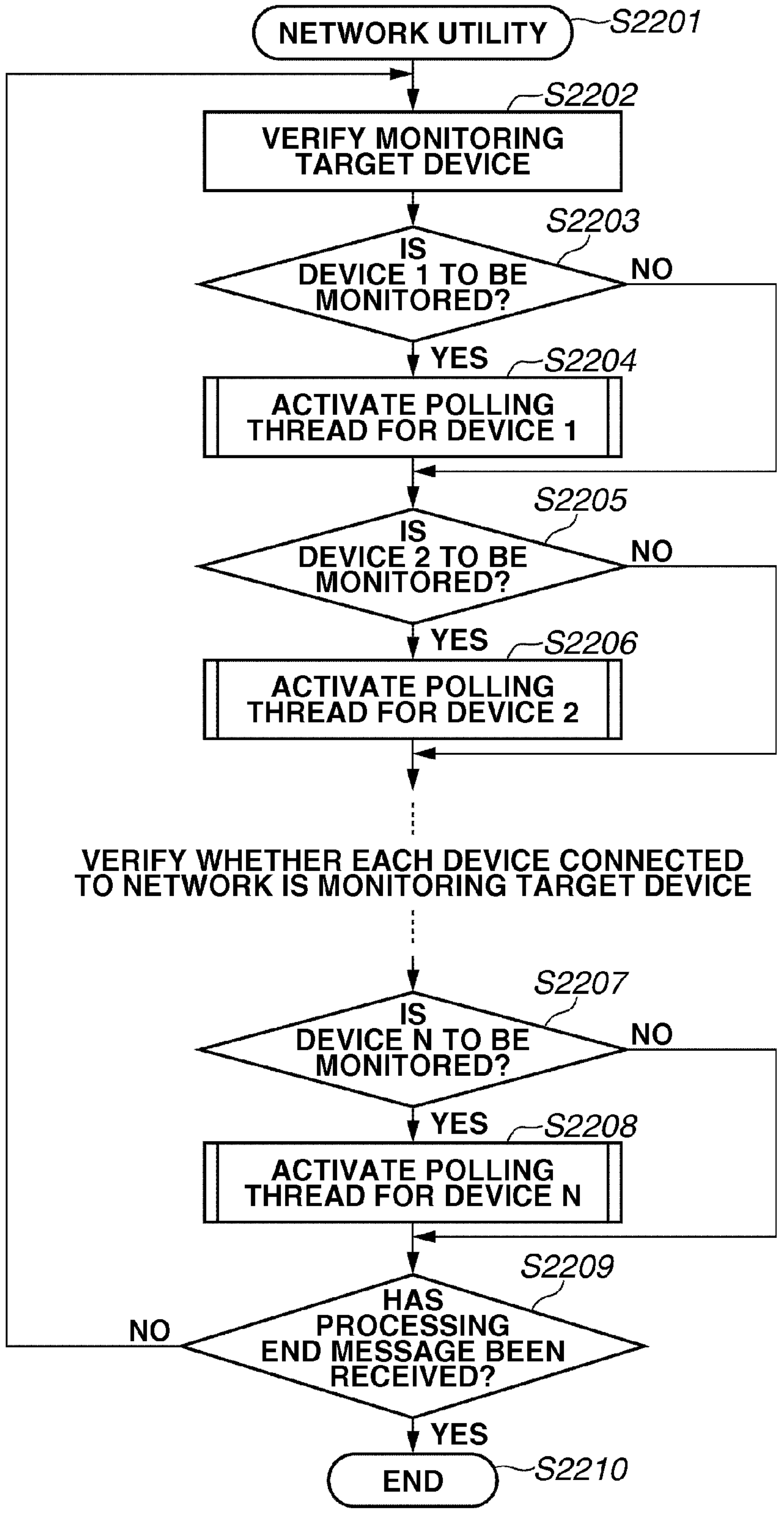

NETWORK UTILITY
S2201
VERIFY MONITORING TARGET DEVICE
S2202
IS DEVICE 1 TO BE MONITORED?
S2203
NO
YES
ACTIVATE POLLING THREAD FOR DEVICE 1
S2204
IS DEVICE 2 TO BE MONITORED?
S2205
NO
YES
ACTIVATE POLLING THREAD FOR DEVICE 2
S2206
VERIFY WHETHER EACH DEVICE CONNECTED TO NETWORK IS MONITORING TARGET DEVICE
IS DEVICE N TO BE MONITORED?
S2207
NO
YES
ACTIVATE POLLING THREAD FOR DEVICE N
S2208
HAS PROCESSING END MESSAGE BEEN RECEIVED?
S2209
NO
YES
END
S2210

FIG.23

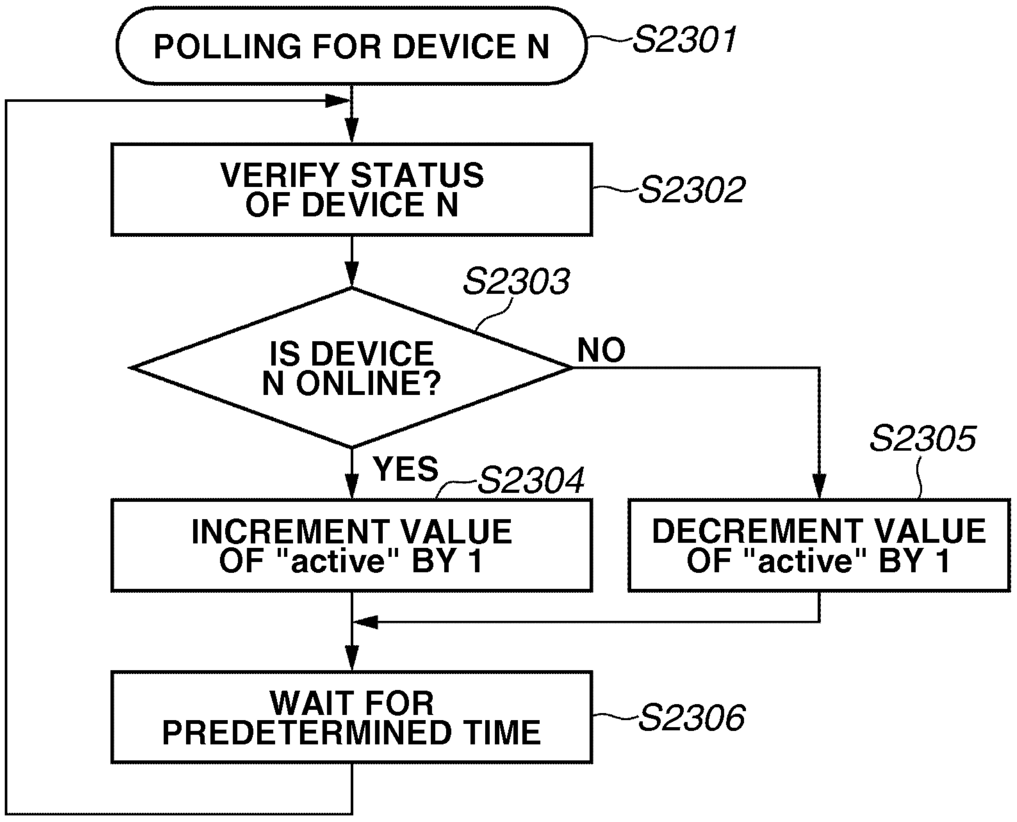

POLLING FOR DEVICE N
S2301
VERIFY STATUS OF DEVICE N
S2302
S2303
IS DEVICE N ONLINE?
NO
YES
S2304
S2305
INCREMENT VALUE OF "active" BY 1
DECREMENT VALUE OF "active" BY 1
WAIT FOR PREDETERMINED TIME
S2306

FIG.24

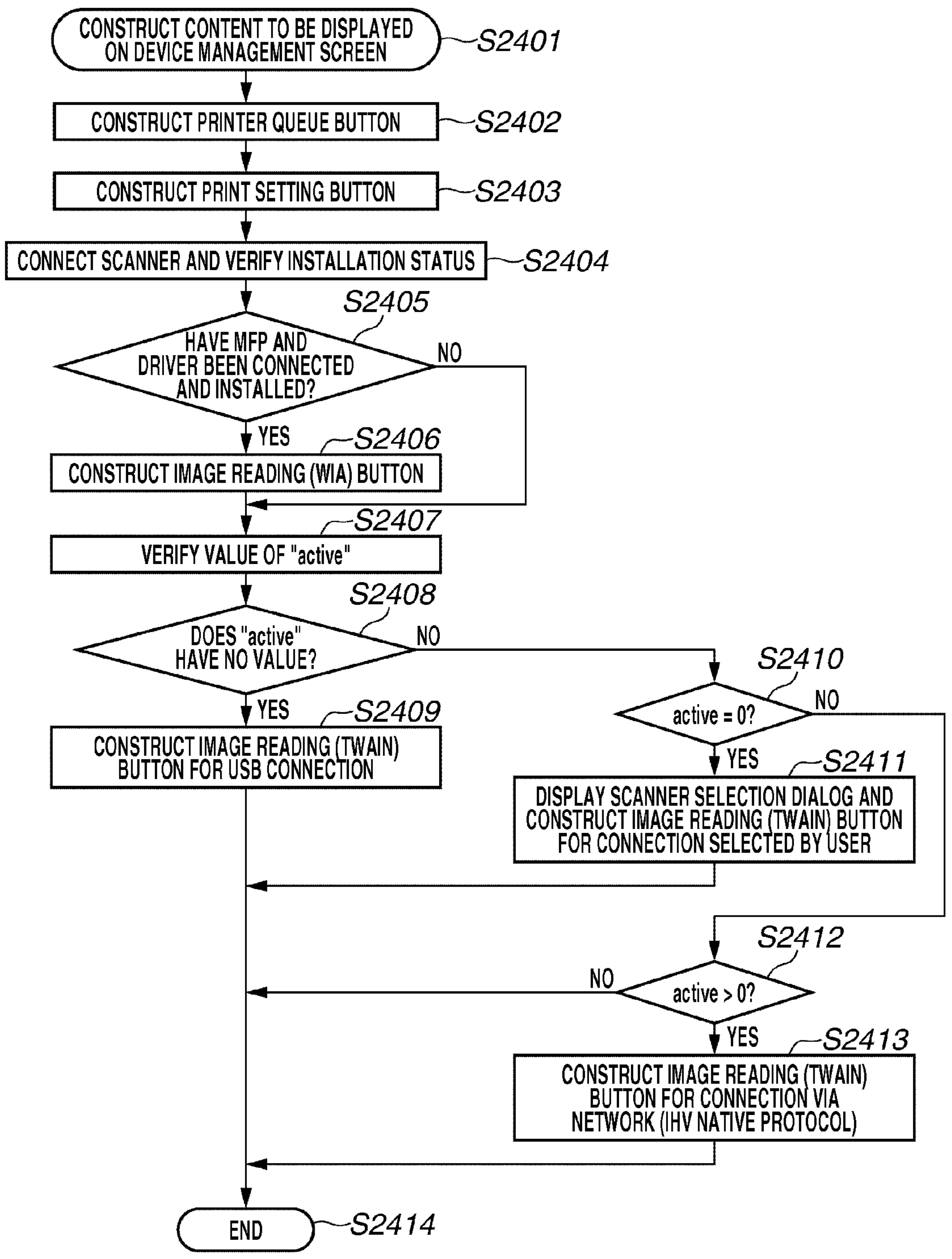
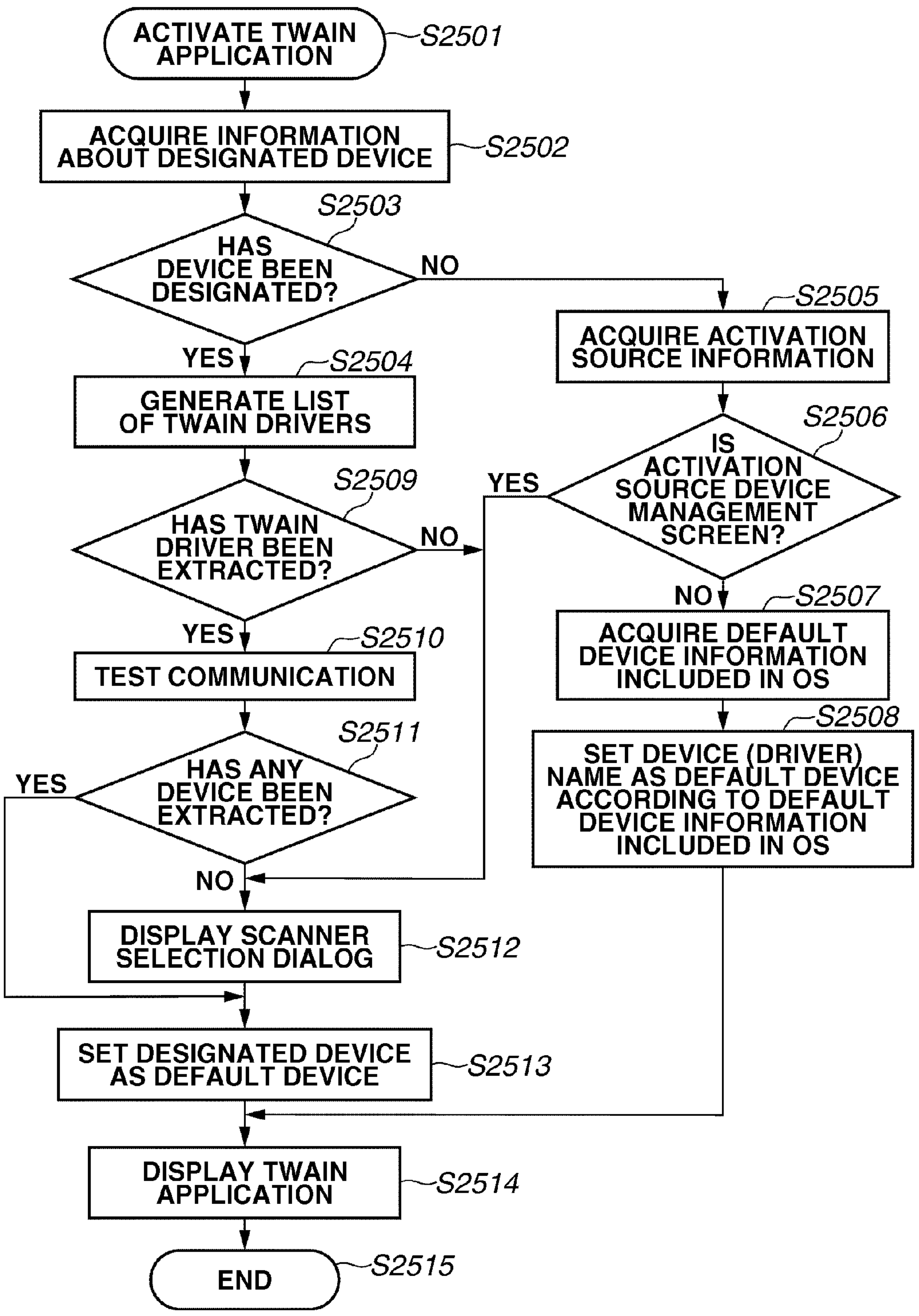

CONSTRUCT CONTENT TO BE DISPLAYED ON DEVICE MANAGEMENT SCREEN
S2401
CONSTRUCT PRINTER QUEUE BUTTON
S2402
CONSTRUCT PRINT SETTING BUTTON
S2403
CONNECT SCANNER AND VERIFY INSTALLATION STATUS
S2404
S2405
HAVE MFP AND DRIVER BEEN CONNECTED AND INSTALLED?
NO
YES
S2406
CONSTRUCT IMAGE READING (WIA) BUTTON
S2407
VERIFY VALUE OF "active"
S2408
DOES "active" HAVE NO VALUE?
NO
S2410
active = 0?
NO
YES
S2409
CONSTRUCT IMAGE READING (TWAIN) BUTTON FOR USB CONNECTION
YES
S2411
DISPLAY SCANNER SELECTION DIALOG AND CONSTRUCT IMAGE READING (TWAIN) BUTTON FOR CONNECTION SELECTED BY USER
S2412
NO
active > 0?
YES
S2413
CONSTRUCT IMAGE READING (TWAIN) BUTTON FOR CONNECTION VIA NETWORK (IHV NATIVE PROTOCOL)
END
S2414

FIG.25


ACTIVATE TWAIN APPLICATION
S2501
ACQUIRE INFORMATION ABOUT DESIGNATED DEVICE
S2502
S2503
HAS DEVICE BEEN DESIGNATED?
NO
YES
S2504
GENERATE LIST OF TWAIN DRIVERS
S2505
ACQUIRE ACTIVATION SOURCE INFORMATION
S2506
IS ACTIVATION SOURCE DEVICE MANAGEMENT SCREEN?
YES
NO
S2509
HAS TWAIN DRIVER BEEN EXTRACTED?
NO
YES
S2510
TEST COMMUNICATION
S2507
ACQUIRE DEFAULT DEVICE INFORMATION INCLUDED IN OS
S2508
SET DEVICE (DRIVER) NAME AS DEFAULT DEVICE ACCORDING TO DEFAULT DEVICE INFORMATION INCLUDED IN OS
S2511
HAS ANY DEVICE BEEN EXTRACTED?
YES
NO
DISPLAY SCANNER SELECTION DIALOG
S2512
SET DESIGNATED DEVICE AS DEFAULT DEVICE
S2513
DISPLAY TWAIN APPLICATION
S2514
END
S2515

INFORMATION PROCESSING APPARATUS, INFORMATION PROCESSING METHOD, AND PROGRAM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an information processing apparatus, an information processing method, and a program.

2. Description of the Related Art

In recent years, a system including an information processing apparatus and a peripheral apparatus connected thereto via an interface, such as universal serial bus (USB), Ethernet®, or wireless local area network (LAN), in which the peripheral apparatus is controlled by the system, has been widely and effectively used in environments such as home or offices. More specifically, a printer, a copying machine, a facsimile apparatus, a scanner, or a digital camera and an apparatus having a combination of functions of the above-described apparatuses and machines are used as a peripheral apparatus.

To Windows® 7 of Microsoft Corporation, anew function for managing a peripheral apparatus connected to an information processing apparatus, such as a personal computer (PC), has been introduced. More specifically, Device Stage® function, which includes a Devices and Printers folder, which is a window for displaying an apparatus connected to the PC, and a function for linking to an application or a service uniquely provided to each peripheral apparatus, has been introduced to Windows® 7.

A screen of the Devices and Printers folder, which is illustrated in FIG. **5**A, can be displayed by an operation from the "start menu" of Windows 7®. Furthermore, a Device Stage screen (FIG. **5**B), which displays information about the status of each peripheral apparatus, can be displayed by an operation via the Devices and Printers folder. The Device Stage screen can provide a visually useful screen. Via the Device Stage screen, a user is allowed to readily utilize and access a function and a service related to the apparatus. If a scanner is used as a peripheral apparatus, a link to an application capable of reading an image and an image of a document can be provided on the Device Stage screen. In this case, by launching and utilizing the application capable of reading an image and an image of a document, an image or a document image can be read by using the peripheral apparatus (scanner).

Meanwhile, with the widespread use of the Internet, various types of online services have been provided, which include an information processing apparatus and a peripheral apparatus connected to the Internet and execute data communication via the Internet. More specifically, a conventional online service utilizes the Device Stage screen including a link to a customer support page of a web site of a manufacturer who provides the online service, which is provided on the Internet. By utilizing the online service like this, a user can easily access a web site provided related to the apparatus. In the following description, the Device Stage screen may also be referred to as a "device management screen".

A conventional system includes a multifunction printer (peripheral) (MFP), which has a plurality of functions such as a printer function, a facsimile transmission function, a scanner function, and a storage function. Conventionally, if a user desires to read an image or a document image by utilizing the scanner function of an MFP from an application, the user generally executes the following operations. More specifically, the user:

(1-1) launches the application,

(1-2) selects a scanner (driver), which is an input device, via a scanner selection portion provided to the application, and

(1-3) executes reading by using the application.

Suppose that a plurality of input devices, such as an MFP or a scanner, is connected to one PC and that drivers for the input devices have already been installed on the PC. In this case, after image reading processing is executed at least once, an input device that has been selected last is often selected as a default device to be used when the application is launched the next time. Japanese Patent Application Laid-Open No. 85132 discusses the above-described conventional method.

When an image of a document set on an MFP is read by using an application linked on the Device Stage screen, processing executed therefor is different from that in a conventional method. To paraphrase this, because the Device Stage screen is displayed via the Devices and Printers folder, the following operations are to be executed. More specifically, the user:

(2-1) opens the Devices and Printers folder,

(2-2) selects a peripheral apparatus to be operated within the Devices and Printers folder,

(2-3) opens the Device Stage screen for the peripheral apparatus,

(2-4) launches the application via the Device Stage screen, and

(2-5) executes reading by using the application.

Suppose that a plurality of input devices, such as an MFP or a scanner, is connected to one PC and that drivers for the input devices have already been installed on the PC. In addition, suppose that image reading processing has been executed at least once, from the application, by using a specific scanner. In this state, the scanner is selected as a default device to be used when the application is launched the next time.

In this state, by using an MFP different from the scanner and by executing the operations (2-1) through (2-5), suppose that processing is further executed for reading an image of a document set on the MFP. If the image reading processing is executed from the application in the operation (2-5), then the application executes document image reading processing by using the scanner that has been set as the default device in the application, instead of using the MFP. As a result, the image or the document image desired by the user cannot be read and the image reading processing may fail.

Suppose that an MFP is connected to one PC via a plurality of interfaces, such as USB or an Ethernet network. In this case, the driver of the MFP may vary (i.e., the name of the driver of the MFP may vary) according to the interface used for the connection. More specifically, if a TWAIN driver connected via USB is used as illustrated in FIG. **6**B, a driver name "ABC Kmmn (TWAIN)" is displayed in a scanner selection field of the application. On the other hand, if a TWAIN driver connected via a network by using an independent hardware vendor (IHV) native protocol is used, a driver name "ABC Kmmn (TWAIN) Network" is displayed in a scanner selection field of the application.

Furthermore, suppose that an MFP is connected to one PC via two interfaces, i.e., via USB and an Ethernet network. In this case, the user selects a USB-connected TWAIN driver "ABC Kmmn (TWAIN)" via a scanner selection field of the application by executing the operation (1-2) of the operation of a conventional method. Then, the user performs the operation (2-3) to executing reading by the MFP from the application via USB connection. When the reading is completed, in the application, the USB-connected TWAIN driver "ABC

Kmmn (TWAIN)" is selected as a default device used when the application is launched the next time.

Moreover, suppose, in this state, that a USB cable used for the USB connection is taken off from the MFP to cause the MFP to be connected to the PC via the Ethernet network only. Suppose further that an application linked with the Device Stage screen is launched in this state and that the user executes reading by the MFP via the Ethernet network by using a TWAIN driver "ABC Kmmn (TWAIN) Network", which is connected via a network by using an IHV native protocol. In this case, if the reading is executed from the application by executing the operation (2-5), the application executes the following operations.

More specifically, the application uses the TWAIN driver "ABC Kmmn (TWAIN)", which is connected via USB and set as the default device within the application, to execute image reading (document image reading) processing. In other words, the application does not use the TWAIN driver "ABC Kmmn (TWAIN) Network" connected via the network by using the IHV native protocol in this case.

More specifically, the application performs not use the TWAIN driver "ABC Kmmn (TWAIN) Network" of the network the connection of the IHV native protocol.

As a result, an image (document image) desired by the user to be read cannot be read because the MFP is connected to the PC not via USB. Accordingly, in this case, the image (document image) reading processing may fail.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, an apparatus includes a management unit configured to manage a device that provides a plurality of functions, and a utilization unit configured to utilize one function among the plurality of functions. In the apparatus, the management unit is configured to confirm whether a function different from the one function, among the plurality of functions, is available according to management and control data that includes information for constructing a management screen, which manages the device and configured to set an argument to an object indicating a link to the utilization unit according to a result of the confirmation. In addition, in the apparatus, the utilization unit is configured, if the object, which is displayed on the management screen, is designated, to set the device according to the argument.

Further features and aspects of the present invention will become apparent from the following detailed description of exemplary embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate exemplary embodiments, features, and aspects of the invention and, together with the description, serve to explain the principles of the present invention.

FIG. **1** illustrates an exemplary system configuration of a peripheral apparatus control system including an information processing apparatus and a peripheral apparatus.

FIGS. **2**A and **2**B illustrate an exemplary hardware configuration of a PC and an MFP.

FIG. **3** illustrates an exemplary software configuration of the PC.

FIG. **4** illustrates an exemplary configuration of a printer driver of the PC.

FIGS. **5**A and **5**B illustrate an example of a Devices and Printers folder and a device management screen.

FIGS. **6**A through **6**D illustrate an example of a Windows Image Acquisition (WIA) application and a TWAIN application.

FIGS. **7**A and **7**B illustrate an exemplary software configuration of the PC.

FIG. **8** illustrates an example of a content of a device management and control file.

FIG. **9** illustrates an example of a content of a device management and control file.

FIG. **10** illustrates an exemplary software configuration of a device management application and a TWAIN application.

FIG. **11** is a flow chart illustrating an example of processing executed when a device is connected.

FIG. **12** is a flow chart illustrating an example of processing for installing a device management and control file.

FIG. **13** is a flow chart illustrating an example of processing for launching a device management screen.

FIG. **14** is a flow chart illustrating an example of processing for constructing a content to be displayed on a device management screen.

FIG. **15** is a flow chart illustrating an example of processing for launching a TWAIN application.

FIGS. **16**A and **16**B illustrate an example of a device management screen and a manual therefor.

FIG. **17** illustrates an example of a content of a device management and control file.

FIG. **18** illustrates an example of a content of a device management and control file.

FIG. **19** is a flow chart illustrating an example of processing for constructing a content to be displayed on the device management screen.

FIG. **20** illustrates an example of a content of a device management and control file.

FIG. **21** illustrates an example of a network utility.

FIG. **22** is a flow chart illustrating an example of processing executed by using the network utility.

FIG. **23** is a flow chart illustrating an example of processing for polling a device N.

FIG. **24** is a flow chart illustrating an example of processing for constructing a content to be displayed on the device management screen.

FIG. **25** is a flow chart illustrating an example of processing for launching a TWAIN application.

DESCRIPTION OF THE EMBODIMENTS

Various exemplary embodiments, features, and aspects of the invention will be described in detail below with reference to the drawings.

The Windows 7 operating system (OS) mentioned here is well known and will not be described in detail here.

In addition, in the following description, a term "USB" refers to a universal serial bus. USB is well known and will not be described in detail here.

Furthermore, a term "WSD" is an abbreviation of "web service on devices". WSD is well known and will not be described in detail here.

In addition, in the following description, a term "WIA" is an abbreviation of "Windows Image Acquisition". WIA is an application program interface (API), which is a standard interface for inputting an image on a Windows® OS from an image scanner. Accordingly, "WIA" will not be described in detail here.

Moreover, a term "TWAIN" refers to an interface between a PC, a scanner, and a digital camera, which are managed as a TWAIN Working Group apparatus. TWAIN is well known and will not be described in detail here.

A first exemplary embodiment of the present invention will now be described below. FIG. **1** illustrates an exemplary system configuration of a peripheral apparatus control system including an information processing apparatus and a peripheral apparatus.

Referring to FIG. **1**, information processing apparatuses **1** and **2** are general-purpose PCs. The PCs **1** and **2** includes hardware illustrated in FIG. **2**A. In the present invention, it is supposed that an OS equivalent to Windows® 7 has been installed on the PCs **1** and **2**.

In the example illustrated in FIG. **1**, the PC **1** is connected to a network **4** while the PC **2** is connected to a network **8**. Each of the networks **4** and **8** is an Ethernet® network. A multifunction printer (hereinafter may also be simply referred to as an "MFP") **3** includes a color inkjet printer, a color facsimile apparatus, a color scanner, and an external storage device for flash memory. The MFP **3** is an example of a peripheral apparatus according to the present exemplary embodiment. The MFP **3** is an MFP manufactured by ABC Corporation having a model name "Kmmn". It is useful if a printer, a copying machine, a facsimile apparatus, a scanner, and a digital camera and an apparatus having a combination of functions of the above-described apparatuses (i.e., a multifunction apparatus) are used as the peripheral apparatus of the present invention.

The MFP **3** includes hardware that will be described in detail below with reference to FIG. **2**B. The MFP **3** is connected with the PC **1** via a USB interface **14** and the network **4**. Thus, the MFP **3** and the PC **1** are in interactive communication with each other.

An application **80** includes a file having a ".exe" format (i.e., a file having an extension ".exe") of Windows. The application **80** is an example of an application of the present invention. The application **80** includes a function for displaying a device management screen illustrated in FIG. **5**B.

In addition, the PC **1** includes an application compliant with the TWAIN interface. The TWAIN application **142** will be described in detail below with reference to FIG. **6**B. Furthermore, the PC **1** includes a TWAIN driver **141**, which will be described in detail below with reference to FIG. **7**B. The network **4** is a home network for home consumer use, which is constructed in a house of a user (customer) of the MFP **3**. The MFP **3** is an MFP commonly used among the family of the user, which is connected to the PC **1** via the network **4** within the user's house.

The network **8** is an office network constructed within ABC Corporation. The PC **2**, which is connected to the network **8**, includes a web server **9**. The web server **9** includes a function of a general web server. The web server **9** provides a web site of ABC Corporation via the Internet.

A compact disc-read only memory (CD-ROM) **10** can be mounted on the PC **1**. The CD-ROM **10** stores software (a program) and an electronic file. The web server **9** includes a file storage portion **11** while the CD-ROM **10** includes a file storage portion **12**. A device management and control file **800**, which will be described in detail below with reference to FIGS. **8** and **9**, is stored in the file storage portions **11** and **12** of the web server **9** and the CD-ROM **10**. The device management and control file **800** is loaded and transmitted from the file storage portions **11** and **12**. The device management and control file **800** is an example of device management and control data.

An analog telephone line **5** is used by the PC **1** for transmitting and receiving a facsimile document via MFP **3**. A flash memory **6** can be mounted into a flash memory insertion slot (not illustrated) of the MFP **3**. The flash memory **6** can be referred to from the PC **1** as a storage device. An MFP **7** is an MFP different from the MFP **3**. The MFP **7** is manufactured by XYZ Corporation having a model name "Defg".

FIGS. **2**A and **2**B illustrate an exemplary hardware configuration of the PC and the MFP according to the present exemplary embodiment. The PCs **1** and **2** include hardware illustrated in FIG. **2**A. In the present exemplary embodiment, the hardware configuration of the PC **1** will be described with reference to FIG. **2**A, representing the hardware configuration of the PCs **1** and **2**.

Referring to FIG. **2**A, the PC **1** includes a random access memory (RAM) unit (hereinafter simply referred to as a "RAM") **201**, a hard disk drive (HDD) **202**, a keyboard (KBD) **203**, and a central processing unit (CPU) **204**. In addition, the PC **1** includes a display (a liquid crystal display (LCD) **205** and a network board (NB) **207**. Furthermore, the PC **1** includes a bus **206**. The RAM **201**, the HDD **202**, the KBD **203**, the CPU **204**, the LCD **205**, and the NB **207** are in communication with one another via the bus **206**.

The HDD **202** is an example of a storage unit. The KBD **203** is an example of an input unit. The CPU **204** is an example of a control unit. The LCD **205** is an example of a display unit. The NB **207** is an example of a communication control unit. A USB port of the USB interface **14** use is included in the NB **207**. It is also useful if a portable CD-ROM or a built-in read-only memory (ROM) is used as the storage unit.

An application, such as the device management application **80** or the TWAIN application **142**, and each module (software) illustrated in FIGS. **3**, **4**, **7**, and **10** are stored on the HDD **202** and are loaded and executed by the CPU **204** on the RAM **201** where necessary. Thus, the CPU **204** implements a function of the application, such as the device management application **80** or the TWAIN application **142**, and each module (software) illustrated in FIGS. **3**, **4**, **7**, and **10**. The TWAIN application **142** is an example of a utilization unit. The MFP **3** has the hardware configuration illustrated in FIG. **2**B.

In the example illustrated in FIG. **2**B, a CPU **15** includes a microprocessor. The CPU **15**, which functions as a central processing unit of the MFP **3**, controls a RAM **17**, a communication unit **18**, a recording unit **19**, an operation unit **20**, a display unit **21**, a reading unit **22**, a facsimile control unit **23**, and an external storage control unit **24** according to a program stored on a ROM **16**.

The ROM **16** stores a program used by the MFP **3** for executing recording (printing) and a program used by the MFP **3** for executing processing for notifying information about the status of print processing to the PC **1** under control of a printer driver **50**. In addition, the ROM **16** stores a program used by the MFP **3** for transmitting and receiving a facsimile document under control of a FAX driver (not illustrated). Furthermore, the ROM **16** stores a program used by the MFP **3** for notifying the status of transmission or reception of facsimile documents to the PC **1** under control of the FAX driver (not illustrated). Moreover, the ROM **16** stores a program used by the MFP **3** for executing image reading processing under control of a WIA driver **704** (FIG. **7**A) or the TWAIN driver **141**. In addition, the ROM **16** stores a program used by the MFP **3** for notifying the status of image reading operations to the PC **1** under control of the WIA driver **704** (FIG. **7**A) and the TWAIN driver **141**.

The RAM **17** temporarily and primarily stores print data, which is transmitted from the PC **1** and based on which an image is to be printed by the recording unit **19**. In addition, the RAM. **17** temporarily stores various data, such as image data read by the reading unit **22**, data to be transmitted by facsimile, which has been transmitted from the PC **1**, and data received by facsimile control unit **23** as facsimile data.

The communication unit **18** includes the USB interface **14**, a connection port for connection via the network **4**, and a connection port for connection via the analog telephone line **5**. The communication unit **18** controls analog communication via facsimile. The recording unit **19** includes a recording unit and an electric circuit. The recording unit of the recording unit **19** includes an inkjet type recording head, each color ink, a carriage, and a recording paper conveyance mechanism. The electric circuit of the recording unit **19** includes an application specific integrated circuit (ASIC), which is used for generating a printing pulse at the recording head based on the print data.

By executing a printing operation by using an application capable of executing printing or by executing a facsimile transmission operation, a content to be displayed (image data) of a file opened by the application is temporarily stored on the HDD **202** of the PC **1** as a spool file of the Enhanced Metafile (EMF) format. The spool file is then converted by the printer driver **50** or the FAX driver into print data or into facsimile transmission data including a command for controlling the MFP **3**. Furthermore, the print data or the facsimile transmission data is then transmitted to the MFP **3** via the USB interface **14** or the network **4**.

The print data received by the MFP **3** is converted by the recording unit **19** into a printing pulse and then is printed on a recording paper based on the printing pulse. On the other hand, the facsimile transmission data received by the MFP **3** is converted by facsimile control unit **23** into a facsimile communication protocol and then is transmitted to a communication destination facsimile machine via the analog telephone line **5**.

The operation unit **20** includes various buttons, such as a power button or a reset button. The user can execute a job by using the MFP **3** by operating the operation unit **20**. The display unit **21** includes a touch panel, which includes an LCD. The display unit **21** can display the status of the MFP **3**. Furthermore, the user can execute various settings via the display unit **21**. In addition, the user can enter, display, and confirm various settings and the telephone number of a communication destination facsimile apparatus.

The reading unit **22** includes a color image sensor and an electric circuit including an image processing ASIC. The reading unit **22** controls the scanner function. Facsimile control unit **23** includes a FAX modem and an analog communication circuit. Facsimile control unit **23** controls transmission and receipt of a facsimile document according to the facsimile communication protocol.

The external storage control unit **24** includes a flash memory mounting slot and an interface circuit for storage device. The external storage control unit **24** controls a flash memory mounted on the MFP **3**.

FIG. **3** illustrates an exemplary software configuration of the PC. Referring to FIG. **3**, the PC **1** includes an Ethernet control stack **92**, an Internet protocol (IP) network control stack **91**, a WSD control stack **90**, an IHV native protocol control stack **89**, and an N-PnP control stack **88**. The Ethernet control stack **92** controls Ethernet. The IP network control stack **91** controls an IP network. The WSD control stack **90** controls WSD. The IHV native protocol control stack **89** controls an IHV-unique protocol. The N-PnP control stack **88** controls Network Plug and Play (hereinafter simply referred to as "N-PnP").

Meanwhile, a standard function of Windows® 7 OS "Plug and Play Extensions (PnP-X)" has been presented as one of Plug and Play Extension functions for supporting network-connected devices. However, N-PnP is used in the present exemplary embodiment as a function equivalent to PnP-X.

Device drivers **85** includes standard drivers **87**, which are included in the OS as standards, and IHV-manufactured drivers **86**, which are provided by IHVs. An application/device driver interface (DDI) interface **84** includes an application programming interface (API) and a DDI. A device management application **80** is included in the OS as standard.

A print application **30** is an application capable of executing printing, which will be described in detail below with reference to FIG. **4**. The TWAIN application **142** complies with the TWAIN interface. A WIA application **143** complies with the WIA interface, which will be described in detail later below with reference to FIG. **6**A.

Applications **82** includes the device management application **80** and the applications **30**, **142**, and **143**. The device management application **80** is capable of managing, executing, and displaying a Device and Printers folder **500** (FIG. **5**A) and a device management screen **600** (FIG. **5**B) via the application/DDI interface **84**. In the following description, the Device and Printers folder **500** will be simply referred to as a "folder" **500**.

FIG. **4** illustrates an example of a printer driver included in the PC. Referring to FIG. **4**, the printer driver **50** is a printer driver for the MFP **3**, which is installed on the PC **1**. The printer driver **50** includes a plurality of modules **33** through **36** and **39**. The application (print application) **30**, which is capable of executing printing, is equivalent to "Notepad" (Notepad.exe), which is a text editor included in the OS as standard.

A graphics device interface (GDI) **31** constitute apart of the OS. A printer queue **32** is included in the spooler **40** as a part thereof. The printer queue **32** queues a print job. A queued print job is displayed in a printer queue folder **107** (FIG. **19**).

A print processor **33** changes a print layout and executes special processing on an image to be printed. A graphics driver **34**, which is a core component of the printer driver for image processing, executes image processing for printing according to a drawing command from the GDI **31** and generates a print control command.

A user interface (UI) module **35** provides and controls a UI of the printer driver. A language monitor **36** is a data communication interface (I/F) configured to control transmission and receipt of data. A status monitor **39** displays information about a status of the MFP **3**, such as the ink remaining amount, an issued warning, and error events.

A port monitor **37** transmits data received from the language monitor **36** to an appropriate port. In addition, the port monitor **37** receives data transmitted from the MFP **3** via a class driver **38**. The class driver **38** is a low level module provided closest to a port. In the present exemplary embodiment, the class driver **38** is equivalent to a WSD- or IHV-unique protocol printer class driver. The class driver **38** controls a port (in the present exemplary embodiment, a USB port or a network port). The printer driver **50** is manufactured by ABC Corporation, which is the manufacturer of the MFP **3**.

FIG. **5** illustrates an example of a Devices and Printers folder and a device management screen. Referring to FIG. **5**A, the Devices and Printers folder **500** is displayed on the PC **1**. Furthermore, a printer and a FAX machine that can be utilized from the PC **1** for each driver are displayed in the Devices and Printers folder **500**. In the present exemplary embodiment, a device **501**, whose name is "XYZ Defg", and a device **503**, whose name is "ABC Kmmn", are displayed in the Devices and Printers folder **500** as available devices.

A default mark **502** indicates a default device of the system. In the present exemplary embodiment, the device **501** has been set as the default device. In the folder **500**, a device icon of the device **501** is illustrated with dotted lines. This indicates that the device **501** is not currently available. On the other hand, a device icon of the device **503** is illustrated with solid lines. This indicates that the device **503** is currently available.

Referring to FIG. **5**B, when the device **503** of the Devices and Printers folder **500** (FIG. **5**A) is selected by the user, the device management screen **600** is launched and displayed. The MFP **3** can be managed via the device management screen **600**. In the upper field of the device management screen **600**, a device icon **601**, a device name **602**, and manufacturer information **603** are displayed.

Data of the device icon **601** is stored in apart (area) (not illustrated) of a device management and control file storage unit **905** (FIG. **10**). The device name **602** displays the device name of the device **503** displayed in the folder **500**. The manufacturer information **603** displays a text string designated in an element <dm:manufacturer> **801** (FIG. **8**).

On the other hand, in the lower field of the device management screen **600**, a link to each function associated with the device **503** is displayed. More specifically, a printer queue button **604**, a print setting button **605**, an image reading (WIA) button **610**, and an image reading (TWAIN) button **611** are displayed. In the following description, the image reading (WIA) button **610** will also be simply referred to as the "reading (WIA) button **610**" while the image reading (TWAIN) button **611** will also be simply referred to as the "reading (TWAIN) button **611**". The image reading (TWAIN) button **611** is an example of an object.

In an element <dm:functions>**803** (FIGS. **8** and **9**), elements <dm:function> **804**, **839** through **844**, each of which describing each corresponding button and function, are described. For the image reading (TWAIN) button **611**, arguments are set when the TWAIN application **142** is launched may vary according to the status of connection between the PC **1** and the MFP **3**.

FIGS. **6**A through **6**C illustrate an example of a WIA application and a TWAIN application. Referring to FIG. **6**A, the WIA application **143** is included in the OS as standard. More specifically, the WIA application **143** is software that operates in interlock with a WIA driver, such as a WIA driver **703** or **704** (FIG. **7**A). Furthermore, the WIA application **143** is software capable of reading an image by using the scanner of the MFP **3**.

A scanner selection field **620** is a scanner for reading an image. The user can select a WIA driver installed on the PC **1** via the scanner selection field **620**. In the example illustrated in FIG. **6**A, the WIA driver "ABC Kmmn (WIA)" has been selected. The user can select a scanner (driver) via a scanner selection dialog **622** (FIG. **6**C). The scanner selection dialog **622** is displayed when the user presses a scanner change button **624**.

FIG. **6**C illustrates an example of the scanner selection dialog **622**. Referring to FIG. **6**C, the scanner selection dialog **622** includes a scanner selection field **623**. The scanner selection field **623** displays the WIA driver installed on the PC **1**. By selecting a WIA driver, the user can designate a scanner (driver) to be used for reading an image by using the WIA application **143**.

In the present exemplary embodiment, any of the scanners (drivers) "ABC Kmmn (WIA)", "ABC Kmmn WSD (WIA)", and "XYZ Defg (WIA)" can be selected. The scanner (driver) "ABC Kmmn (WIA)" is an alternative for the WIA driver **704**, which is allocated to the MFP **3** when the IHV-manufactured WIA driver **704**, which is manufactured by the manufacturer of the MFP **3** (in the present exemplary embodiment, ABC Corporation) is installed on the MFP **3**, if the MFP **3** is connected to the PC **1** via the USB interface **14**.

The scanner (driver) "ABC Kmmn WSD (WIA)" is an alternative for the WIA driver **703**, which is allocated to the MFP **3** when the WIA driver **703**, which is included in the OS as standard, is installed on the MFP **3** if the MFP **3** is connected to the PC **1** via the network **4** by using WSD. On the other hand, the scanner (driver) "XYZ Defg (WIA)" is an alternative for the WIA driver **703**, which is allocated to the MFP **7** when the WIA driver **703**, which is included in the OS as standard, is installed on the MFP **7** if the MFP **7** is connected to the PC **1** via the network **4** by using WSD. In the example illustrated in FIG. **6**C, the scanner (driver) "ABC Kmmn (WIA)" has been selected.

In the example illustrated in FIG. **6**B, the TWAIN application **142** is a TWAIN application manufactured by ABC Corporation. More specifically, the TWAIN application **142** is software that operates in interlock with a TWAIN driver, such as the TWAIN driver **141** (FIG. **7**B). Furthermore, the TWAIN application **142** is software capable of reading an image by using the scanner of the MFP **3**.

Via a scanner selection field **621**, the user can select the TWAIN driver that has been installed on the PC **1** as the scanner (driver) for reading an image. For the scanner for reading an image, the user can select any from among the scanners "ABC Kmmn (TWAIN)", "ABC Kmmn (TWAIN) WSD", and "ABC Kmmn (TWAIN) Network". The scanner (driver) "ABC Kmmn (TWAIN)" is an alternative for the TWAIN driver **141**, which is allocated to the MFP **3** when the TWAIN driver **141**, which is manufactured by the manufacturer of the MFP **3** (in the present exemplary embodiment, ABC Corporation) is installed on the MFP **3**, if the MFP **3** is connected to the PC **1** via the USB interface **14**.

The scanner (driver) "ABC Kmmn (TWAIN) WSD" is an alternative for the TWAIN driver **141**, which is allocated to the MFP **3** when the TWAIN driver **141** is installed on the MFP **3** if the MFP **3** is connected to the PC **1** via the network **4** by using WSD. On the other hand, the scanner (driver) "ABC Kmmn (TWAIN) Network" is an alternative for the TWAIN driver **141**, which is allocated to the MFP **3** when the TWAIN driver **141** is installed on the MFP **3** if the MFP **3** is connected to the PC **1** via the network **4** by using the IHV native protocol. In the example illustrated in FIG. **6**B, the scanner (driver) "ABC Kmmn (TWAIN)" has been selected.

FIG. **6**D illustrates an exemplary scanner selection dialog. Referring to FIG. **6**D, a scanner selection dialog **625** is displayed by the TWAIN application **142**. TWAIN drivers installed on the PC **1** is displayed in a scanner selection field **626**. The user can designate a scanner (driver) used for reading an image by using the TWAIN application **142** by selecting a TWAIN driver via the scanner selection field **626**. More specifically, in the present exemplary embodiment, the user can select a scanner (driver) from among the following scanners (drivers):

ABC Kmmn (TWAIN)
ABC Kmmn (TWAIN) WSD
ABC Kmmn (TWAIN) Network

The above-described TWAIN drivers are the same as those described above in relation to the scanner selection field **621**. In the example illustrated in FIG. **6**D, the scanner "ABC Kmmn (TWAIN) Network" has been selected. When the user presses an OK button **627**, the TWAIN application **142** is launched in a state where the TWAIN driver that has been selected via the scanner selection field **626** is designated. If the name of the TWAIN driver, which is a first argument for launching the TWAIN application **142**, has a value "" ("null") (i.e., if the device is an unknown device), then the TWAIN application **142** displays the scanner selection dialog **625**.

The TWAIN application **142** has a function for designating the default scanner (driver) and the application launching source, which are selected when launching the application, according to the following launching arguments:

```
First argument: TWAIN driver name
Second argument: application launching source
                 /devmng: used when launching from
                          device management screen
                 /other: used when launching from
                          source other than
                          device management screen
```

[Case 1]

TWAINScan.exe "ABC Kmmn (TWAIN)"/devmng

In Case 1, the TWAIN application **142** is launched from the device management screen **600** and the MFP **3** reads an image by using the TWAIN driver **141** via USB connection.

[Case 2]

TWAINScan.exe "ABC Kmmn (TWAIN) WSD"/devmng

In Case 2, the TWAIN application **142** is launched from the device management screen **600** and the MFP **3** reads an image by using the TWAIN driver **141** via network by WSD.

[Case 3]

TWAINScan.exe "ABC Kmmn (TWAIN) Network"/devmng

In Case 3, the TWAIN application **142** is launched from the device management screen **600** and the MFP **3** reads an image by using the TWAIN driver **141** via network connection by the IHV native protocol.

[Case 4]

TWAINScan.exe "ABC Kmmn (TWAIN)"/other

In Case 4, the TWAIN application **142** is launched from a source other than the device management screen and the MFP **3** reads an image by using the TWAIN driver **141** via USB connection. The only difference point between Cases **1** and **4** is the second argument, which describes the application launching source. By utilizing the second argument, the TWAIN application **142** can toggle the processing executed when and after the launch according to the application launching source. Therefore, the present exemplary embodiment can improve the user operability. By launching the TWAIN application **142** to which the first argument has been added, the user can automatically designate the scanner (driver) for reading an image without executing any particular operation, instead of selecting and designating a scanner (driver) via the scanner selection field **621**.

[Case 5]

TWAINScan.exe ""/devmng

In Case 5, after displaying the scanner selection dialog **625** illustrated in FIG. **6**D on the device management screen **600** and after the user has selected a TWAIN driver (the TWAIN driver **141** in the present exemplary embodiment), the TWAIN application **142** is launched and the MFP **3** reads an image by using the TWAIN driver **141**, which has been selected by the user.

FIG. **7** illustrates an exemplary software configuration of the PC. Referring to FIGS. **7**A and **7**B, a kernel input/output (I/O) driver **705** is included in the OS as standard. FIG. **7**A illustrates an exemplary software configuration used for reading an image on the MFP **3** by using the WIA application **143**.

Referring to FIG. **7**A, the WIA application **143** (FIG. **6**A) is included in the OS as standard. The standard WIA driver **703** is included in the OS as standard. The IHV WIA driver **704** is a driver manufactured by ABC Corporation. A Still Image Architecture (STI)/WIA service **702** is included in the OS as standard. The STI/WIA service **702** is an interface between the WIA application **143** and the WIA drivers **703** and **704**.

FIG. **7**B illustrates an exemplary software configuration used for reading an image on the MFP **3** by using the TWAIN application **142**. Referring to FIG. **7**B, the TWAIN application **142** (FIG. **6**) is an application manufactured by ABC Corporation. A TWAIN data source manager **707** is included in the OS as standard. The TWAIN driver **141** is a driver manufactured by ABC Corporation. The TWAIN data source for the MFP **3** is included in the TWAIN driver **141**.

FIGS. **8** and **9** illustrate an example of a content of a device management and control file. Referring to FIG. **8**, a device management and control file **800** is a file used on an English-based OS. Information illustrated in FIGS. **8** and **9** is stored on the file storage portions **11** and **12**.

In the example illustrated in FIG. **8**, the name of the manufacturer of the device (the MFP **3**), i.e., ABC Corporation, is set to an element <dm:manufacturer> **801**. The model name of the device (the MFP **3**), i.e., "Kmmn", is set to an element <dm:model> **802**. The above-described information is utilized in installing the device management and control file **800**. The device management and control file **800** also includes information used to construct the device management screen **600**.

On the device management screen **600**, which is launched and displayed when the MFP **3** is connected to the PC **1**, in order to display the printer queue button **604** (FIG. **5**B), the print setting button **605** (FIG. **5**B), the image reading (WIA) button **610** (FIG. **5**B), and the image reading (TWAIN) button **611** (FIG. **5**B), elements <dm:function> **804**, **839** through **841**, and **842** through **844**, which describe each corresponding button and function, are set in an element <dm:functions> **803**.

In an element <dm:name xml:lang="en-US">Open Printer Queue</dm:name>**805** included in the element <dm:function> **804**, a text string "Open Printer Queue" is set, which is displayed on the printer queue button **604**. In an element <dm:execute>open Printer Queue</dm:execute> **806**, a code "open Printer Queue" is set, which describes a function (program) for displaying a printer queue folder. Although not illustrated in the drawing, the printer queue folder includes a function for displaying the status of a print job.

In an element <dm:name xml:lang="en-US">Printing Preferences</dm:name> **807** included in the element <dm:function> **839**, a text string "Printing Preferences" is set, which is displayed on the print setting button **605**. In an element <dm:execute>printing Preferences</dm:execute> **808**, a code "printing Preferences" is set, which describes a function (program) for displaying a print setting dialog. Although not illustrated in the drawing, the "print setting dialog" refers to a print setting screen included in the UI module **35** of the printer driver **50**.

In an element <dm:namexml:lang="en-US">Image Scan (WIA)</dm:name> **809** included in the element <dm:function> **840**, a text string "Image Scan (WIA)" is set, which is displayed on the reading (WIA) button **610**. In an element <dm:required> **810**, information describing a condition for displaying the image reading (WIA) button **610** is set.

An element <dm:device>scanner</dm:device> **811** describes that the device connected to the PC **1** via the USB interface **14** or the network **4** using WSD includes a scanner function that utilizes the WIA driver **704** or the WIA driver **703**. An element <dm:available>true</dm:available> **812** describes that the scanner function that utilizes the WIA driver **704** or the WIA driver **703** is available on the device connected to the PC **1** via the USB interface **14** or the network **4** using WSD. More specifically, the condition described by the element <dm:required> **810** corresponds to a case where an image can be read via network connection using USB or WSD by utilizing the WIA driver **704** or **703**.

In an element <dm:execute>wiaScan</dm:execute> **813**, a code "wiaScan" is set, which describes a function (program) for launching the WIA application **143**. In an element <dm:name xml:lang="en-US">Image Scan (TWAIN) </dm:name> **814** included in the element <dm:function> **841**, a text string "Image Scan (TWAIN)" is set, which is displayed on the reading (TWAIN) button **611**. In an element <dm:required> **845**, information describing a condition for displaying the reading (TWAIN) button **611** is set.

An element <dm:device>storage</dm:device> **815** describes that the device connected to the PC **1** via the USB interface **14** includes a storage function. An element <dm:available>true</dm:available> **816** describes that the storage function of the device connected to the PC **1** via the USB interface **14** is available.

In determining whether the scanner function of the device (the MFP **3**) connected to the PC **1** is available, the element <dm:required> **810** is generally utilized. However, in utilizing the element <dm:required> **810**, the Windows® 7 OS cannot execute auto toggle control. More specifically, the Windows® 7 OS, in the scanner function utilizing the TWAIN driver **141**, cannot execute auto toggle control by distinguishing between USB connection and WSD connection and by executing appropriate control according to the type of the connection.

Therefore, an appropriate value compliant with each of the interfaces of the PC **1** and the MFP **3** cannot be set in the element <dm:required> **810** as an argument used for launching the TWAIN application **142**. Accordingly, the present exemplary embodiment utilizes the "state where the storage function is available", which is a function different from and not related to the scanner function. The "state where the storage function is available" is described in the element <dm:required> **845**.

In other words, by determining the scanner function by identifying the interface between the PC **1** and the device (the MFP **3**) by utilizing the "state where the storage function is available", the present exemplary embodiment enables appropriate information to be set at the time of launching the TWAIN application **142** as the argument. Thus, the present exemplary embodiment can improve the user operability. As described above, the condition described in the element <dm:required> **845** corresponds to a case where an image can be read via USB connection by using the TWAIN driver.

In an element <dm:execute>TWAINScan.exe "ABC Kmmn (TWAIN)"/devmng</dm:execute> **817**, a code "TWAINScan.exe "ABC Kmmn (TWAIN)"/devmng" is set, which describes a function (program) for launching the TWAIN application **142**. Thus, when the reading (TWAIN) button **611** is pressed by the user, the TWAIN application **142** is launched in a state in which the scanner "ABC Kmmn (TWAIN)", which indicates the USB-connected TWAIN driver **141**, has been set as the default scanner (driver). Accordingly, the present exemplary embodiment can achieve a high user operability.

In an element <dm:name xml:lang="en-US">Image Scan (TWAIN) </dm:name> **818** included in the element <dm:function> **842**, a text string "Image Scan (TWAIN)—Select Device" is set, which is displayed on the reading (TWAIN) button **611**. Because the text string set to the element <dm:name> is used as the text string displayed on the reading (TWAIN) button **611**, the text string displayed on the reading (TWAIN) button **611** may be different from the text string illustrated in FIG. **5**B. Information describing a condition for displaying the reading (TWAIN) button **611** is set in an element <dm:required> **846**. An element <dm:device>storage</dm:device> **819** describes that the device connected to the PC **1** via the USB interface **14** includes the storage function.

An element <dm:available>false</dm:available> **820** describes that the storage function of the device connected to the PC **1** via the USB interface **14** is not currently available.

In order to determine whether the scanner function of the device (the MFP **3**) connected to the PC **1** is not available, the following elements are generally utilized:

```
<dm:required>
<dm:device>scanner</dm:device>
<dm:available>false</dm:available>
</dm:required>.
```

However, in utilizing the element <dm:required>, the Windows® 7 OS cannot execute the following control.

More specifically, the scanner function of the Windows® 7 OS cannot execute auto toggle control for distinguishing between the USB network connection and the WSD network connection and for executing appropriate control according to each type of connection. Therefore, an appropriate value compliant with each of the interfaces of the PC **1** and the MFP **3** cannot be set in the element <dm:required> as an argument used for launching the TWAIN application **142**.

Accordingly, the present exemplary embodiment utilizes the "state where the storage function is available", which is a function different from and not related to the scanner function. The "state where the storage function is available" is described in the element <dm:required> **846**. In other words, by determining the scanner function by identifying the interface between the PC **1** and the device (the MFP **3**) by utilizing the "state where the storage function is not available", the present exemplary embodiment enables appropriate information to be set at the time of launching the TWAIN application **142** as the argument. Thus, the present exemplary embodiment can improve the user operability.

As described above, the condition described in the element <dm:required> **846** corresponds to a case where an image cannot be read via USB connection by using the TWAIN driver. In other words, the condition described in the element <dm:required> **846** corresponds to a case where the PC **1** and the MFP **3** are not mutually connected via the USB interface **14** or the network **4**.

In this case, it is useful if the TWAIN application **142** is launched in a state where the TWAIN application **142**, at first, displays the scanner selection dialog **625** (FIG. **6**D) and the TWAIN driver selected by the user is set in the scanner selection field **621**. Accordingly, the present exemplary embodiment sets information for constructing the reading (TWAIN) button **611**, which is a trigger for displaying the scanner selection dialog **625** (FIG. **6**D).

In an element <dm:execute> TWAINScan.exe ""/devmng </dm:execute> **821**, a code " TWAINScan.exe "ABC Kmmn (TWAIN)" ""/devmng" is set, which describes a function (program) for launching the TWAIN application **142**. Accordingly, if the reading (TWAIN) button **611** is pressed by the user, the TWAIN application **142** is launched in the following manner.

More specifically, the TWAIN application **142** is launched in a state where the scanner selection dialog **625** is displayed and the TWAIN driver selected by the user is set in the scanner selection field **621**. By executing the above-described processing, the user is enabled to appropriately designate a scanner (driver) desired to be used even when the user has not yet prepared or set the scanner desired to be used. Accordingly, the present exemplary embodiment can achieve a high user operability.

In an element <dm:name xml:lang="en-US">Image Scan (TWAIN) </dm:name> **822** included in the element <dm:function> **843**, a text string "Image Scan (TWAIN)" is set, which is displayed on the reading (TWAIN) button **611**. In an element <dm:required> **847**, information describing a condition for displaying the reading (TWAIN) button **611** is set.

An element <dm:device>printer</dm:device> **823** describes that the device connected to the PC **1** includes the printer function. An element <dm:available>true</dm:available> **824** describes that the printer function of the device connected to the PC **1** is currently available. An element <dm:port>WSD</dm:port> **825** describes that the port used for utilizing the printer function of the device is a WSD port. In the present exemplary embodiment, a "WSD port" refers to a port for network connection that utilizes WSD. The element <dm:port>WSD</dm:port> **825** is defined as a function included in the OS as standard.

In determining whether the scanner function of the device (the MFP **3**) connected to the PC **1** is available, the element <dm:required> **810** is generally utilized. However, in utilizing the element <dm:required> **810**, the Windows® 7 OS cannot execute auto toggle control. More specifically, the Windows® 7 OS, in the scanner function utilizing the TWAIN driver **141**, cannot execute auto toggle control by distinguishing between USB connection and WSD connection and by executing appropriate control according to the type of the connection.

Therefore, an appropriate value compliant with each of the interfaces of the PC **1** and the MFP **3** cannot be set in the element <dm:required> **810** as an argument used for launching the TWAIN application **142**. Accordingly, the present exemplary embodiment utilizes the "state where the printer function is available" and the name of the port for the printer function, which are functions different from and not related to the scanner function. The "state where the printer function is available" and the name of the port for the printer function are described in the element <dm:required> **847**.

In other words, by determining the scanner function by identifying the interface between the PC **1** and the device (the MFP **3**) by utilizing the "state where the printer function is available" and the name of the port for the printer function, the present exemplary embodiment enables appropriate information to be set at the time of launching the TWAIN application **142** as the argument. Thus, the present exemplary embodiment can improve the user operability. As described above, the condition described in the element <dm:required> **847** corresponds to a case where an image can be read via WSD network connection by using the TWAIN driver.

An element <dm:execute>TWAINScan.exe "ABC Kmmn (TWAIN) WSD"/devmng</dm:execute> **826**, a code "TWAINScan.exe "ABC Kmmn (TWAIN) WSD"/devmng" is set, which describes a function (program) for launching the TWAIN application **142**.

Accordingly, if the reading (TWAIN) button **611** is pressed by the user, the TWAIN application **142** is launched in the following manner. More specifically, the TWAIN application **142** is launched in a state where the scanner "ABC Kmmn (TWAIN) WSD", which corresponds to the WSD network-connected TWAIN driver **141**, is set as the default scanner (driver). Accordingly, the present exemplary embodiment can achieve a high user operability.

In the element <dm:function> **844**, in an element <dm:name xml:lang="en-US">Image Scan (TWAIN) </dm:name> **827** included therein, a text string called "Image Scan (TWAIN)" is set, which is displayed on the reading (TWAIN) button **611**. Information describing a condition for displaying the reading (TWAIN) button **611** is set in an element <dm:required> **848**.

An element <dm:device>printer</dm:device> **828** describes that the device connected to the PC **1** includes the printer function. An element <dm:available>true</dm:available> **829** describes that the printer function of the device connected to the PC **1** is currently available. In the following description, an attribute "invert="yes"" means that the logic is reversed.

An element <dm:portinvert="yes">LPT</dm:port> **830** describes that the port used for utilizing the printer function of the device is not a local printer (LPT) (parallel) port. An element <dm:portinvert="yes">COM</dm:port> **831** describes that the port to be used for utilizing the printer function of the device is not a component object model (COM) (serial) port.

An element <dm:portinvert="yes">FILE</dm:port> **832** describes that the port to be used for utilizing the printer function of the device is not a FILE (file export) port.

An element <dm:portinvert="yes">IR</dm:port> **833** describes that the port to be used for utilizing the printer function of the device is not an Infrared Data Association (IrDA) (infrared ray) port. An element <dm:portinvert="yes">XPS</dm:port> **834** describes that the port to be used for utilizing the printer function of the device is not an eXtended Markup Language (XML) Paper Specification (XPS) (an XPS file export) port.

An element <dm:portinvert="yes">BTH</dm:port> **835** describes that the port to be used for utilizing the printer function of the device is not a Bluetooth port. An element <dm:portinvert="yes">USB</dm:port> **836** describes that the port to be used for utilizing the printer function of the device is not a USB port. An element <dm:portinvert="yes">WSD</dm:port> **837** describes that the port to be used for utilizing the printer function of the device is not a WSD port.

In determining whether the scanner function of the device (the MFP **3**) connected to the PC **1** is available, the element <dm:required> **810** is generally utilized. However, in utilizing the element <dm:required> **810**, the Windows® 7 OS cannot detect a network connection by an IHV native protocol by using the scanner function that utilizes the TWAIN driver **141**.

In the port name of the network by an IHV native protocol for the printer function, a media access control (MAC) address ("ABC_NET_<MAC address>", for example), which is variable information that is uniquely provided to each device, is included. Accordingly, the port is not included in the OS as standard. Therefore, the port is not defined as a function standard to the OS.

Therefore, it is difficult to distinguish and determine the network port of the IHV native protocol by utilizing the element <dm:port>. As described above, in a state where the network connection by an IHV native protocol is utilized, if the element <dm:required> **810** or the element <dm:required> **847** is utilized, an appropriate value complying with each of the interfaces for the PC **1** and the MFP **3** cannot be set as the argument to be used at the time of launching the TWAIN application **142**.

Accordingly, the present exemplary embodiment utilizes the "state where the printer function is available" and the exclusive OR of the name of the port for the printer function, which are functions different from and not related to the scanner function. The "state where the printer function is available" and the logically exclusive name of the port for the printer function are described in the element <dm:required> **848**.

In other words, by determining the scanner function by identifying the interface between the PC **1** and the device (the MFP **3**) by utilizing the "state where the printer function is available" and the name of the port for the printer function, the present exemplary embodiment enables appropriate information to be set at the time of launching the TWAIN application **142** as the argument. Thus, the present exemplary embodiment can improve the user operability. As described above, the condition described in the element <dm:required> **848** corresponds to a case where an image can be read by using the TWAIN driver via the network connection that uses an IHV native protocol.

A code "TWAINScan.exe "ABC Kmmn (TWAIN) Network"/devmng" is set in an element <dm:execute>TWAINScan.exe "ABC Kmmn (TWAIN) Network"/devmng</dm:execute> **838**, which describes a function (program) for launching the TWAIN application **142**. Accordingly, if the reading (TWAIN) button **611** is pressed by the user, the TWAIN application **142** is launched in the following manner.

More specifically, the TWAIN application **142** is launched in a state where the scanner "ABC Kmmn (TWAIN) Network", which corresponds to the TWAIN driver **141** that is connected via the network using an IHV native protocol, is set as the default scanner (driver). Accordingly, the present exemplary embodiment can achieve a high user operability.

FIG. **10** illustrates an exemplary software configuration of the device management application and the TWAIN application. Referring to FIG. **10**, the device management application **80** includes a display unit **901**, a device management control unit **902**, a link execution unit **903**, a device management and control file reading unit **904**, and a device management and control file storage unit **905**. The device management and control file storage unit **905** stores the device management and control file **800**, which is stored in step S**1405** (FIG. **12**).

The TWAIN application **142** includes a launching source determination unit **906**, an application control unit **907**, a default device setting unit **908**, a reading control unit **909**, and a status acquisition unit **910**. The reading control unit **909** is a module configured to execute appropriate image processing on the image data read by the MFP **3** and transmitted from the TWAIN driver **141**. The display unit **901** is a module configured to monitor the status of the MFP **3** via the TWAIN driver **141** and to acquire a control command that describes the status of the MFP **3**.

The device management screen **600** is launched and displayed if the MFP **3** is connected to the PC **1** via the USB interface **14** or the network **4** or if the user selects the device displayed in the folder **500** (FIG. **5**A). In the present exemplary embodiment, the case will be primarily described where the MFP **3** is connected to the PC **1** via the USB interface **14** or the network **4** and the device management screen **600** illustrated in FIG. **5**B is launched and displayed.

FIG. **11** is a flow chart illustrating an example of processing executed when the device is connected. A program of the processing according to the flow chart of FIG. **11** is loaded and executed by the CPU **204** from the HDD **202** on the RAM **201**.

Referring to FIG. **11**, in step S**1301**, the device (the MFP **3**) is connected to the PC (the PC **1**) via the USB interface **14** or the network **4**. In step S**1302**, the PC **1** acquires an identification (ID) of the connected device. In the present exemplary embodiment, the device ID is described by using a text string, such as "MFG: ABC; MDL: Kmmn; CLS: PRINTER; CMD: K4; DES: ABC Kmmn;". More specifically, the device ID is a device ID of the printer function of the MFP **3**, which the PC **1** can acquire from the MFP **3** via the USB interface **14** or the network **4**. The device ID includes the following information:

the manufacturer (MFG:):	ABC
the model (MDL:):	Kmmn
the class (CLS:):	PRINTER
the command (CMD:):	K4 (* "K4" is a printer control Command privately used by ABC Corporation)
the description (DES:):	ABC Kmmn

In step S**1303**, the device management application **80** determines whether the driver (the printer driver **50**, the FAX driver, the WIA driver **703**, the WIA driver **704**, or the TWAIN driver **141**) has been installed on the PC **1**. In the following description about the flow chart of FIG. **11**, the printer driver **50**, the FAX driver, the WIA driver **703**, the WIA driver **704**, and the TWAIN driver **141** are collectively referred to as a "driver".

If it is determined that the driver has not been installed on the PC **1** yet (NO in step S**1303**), then the processing advances to step S**1304**. In step S**1304**, the OS installs the driver. In step S**1305**, the OS loads the driver. If the driver is normally loaded, the device (the MFP **3**) is registered in the folder **500** illustrated in FIG. **5**A.

In step S**1306**, the device management application **80** determines whether the device management and control file **800** illustrated in FIGS. **8** and **9** has already been installed on the PC **1**. More specifically, in step S**1306**, the device management application **80** determines whether the already installed device management and control file **800** is compliant with the driver based on the information about the manufacturer (MFG:) and information about the model (MDL:), which is included in the device ID.

If it is determined that the device management and control file **800** has not been installed yet (NO in step S**1306**), then the processing advances to step S**1307**. In step S**1307**, the device management application **80** executes processing for installing the device management and control file **800**. The processing for installing the device management and control file **800** will be described in detail below with reference to FIG. **12**.

In step S**1308**, the device management application **80** executes processing for launching a device management screen illustrated in FIG. **13**. In step S**1309**, the device management application **80** ends the processing executed when the device is connected to the PC **1**.

On the other hand, if it is determined that the device management and control file **800** has already been installed on the PC **1** (YES in step S**1306**), then the processing advances to step S**1308**. On the other hand, if it is determined that the driver has already been installed (YES in step S**1303**), then the processing advances to step S**1305**.

FIG. **12** is a flow chart illustrating an example of processing for installing a device management and control file. A program of the processing of the flow chart illustrated in FIG. **12** is loaded and executed by the CPU **204** from the HDD **202** on the RAM **201**.

When the processing for installing a device management and control file in step S**1307** illustrated in FIG. **11** is executed, the processing in the flow chart of FIG. **12** starts.

Referring to FIG. **12**, in step S**1401**, the device management application **80** starts the processing for installing device management and control file.

In step S**1402**, the device management application **80** confirms the device ID of the device (the MFP **3**) connected to the PC **1** via the USB interface **14** or the network **4**. In step S**1403**, the device management application **80** searches for a device management and control file **800** of the device (the MFP **3**) connected to the PC **1** based on the manufacturer (MFG:) and the model (MDL:) information included in the device ID.

More specifically, the device management and control file **800** illustrated in FIGS. **8** and **9** includes the manufacturer (MFG:) ("ABC") and the model (MDL:) ("Kmmn"), which correspond to the device (the MFP **3**), in the element <dm:manufacturer> **801** and the element <dm:model> **802**.

More specifically, the device management application **80** searches for a device management and control file **800** for the device (the MFP **3**) within the file storage portion **11** of the web server **9** or the file storage portion **12** of the CD-ROM **10** inserted in the PC **1**.

In step S**1404**, the device management application **80** determines whether a device management and control file **800** has been extracted from the file storage portion **11** or the file storage portion **12**. If it is determined that a device management and control file **800** has been extracted (YES instep S**1404**), then the processing advances to step S**1405**. In step S**1405**, the device management application **80** stores the device management and control file **800** at a predetermined location within the HDD **202** of the PC **1**.

In step S**1406**, the device management application **80** installs the device management and control file **800**. After the device management and control file **800** is installed, the processing advances to step S**1407**. In step S**1407**, the processing for installing the device management and control file **800** by the device management application **80** ends. In the present exemplary embodiment, it is supposed that the device management and control file **800** compliant with the device (the MFP **3**) has been extracted and installed.

If no device management and control file **800** has been extracted (NO in step S**1404**), then the processing advances to step S**1407**. In step S**1407**, the processing for installing the device management and control file **800** by the device management application **80** ends.

FIG. **13** is a flow chart illustrating an example of processing for launching a device management screen. A program of the processing according to the flowchart of FIG. **13** is loaded and executed by the CPU **204** from the HDD **202** on the RAM **201**.

When the processing for launching a device management screen in step S**1308** illustrated in FIG. **11** is executed, the processing in the flow chart of FIG. **13** starts. Referring to FIG. **13**, in step S**1501**, the device management application **80** starts processing for launching the device management screen. In addition, when the user selects the device **503** within the folder **500**, the device management application **80** starts the processing for launching the device management screen.

In step S**1502**, the device management control unit **902** acquires the device name selected via the folder **500**. More specifically, in the present exemplary embodiment, the device management control unit **902** acquires the device name "ABC Kmmn" because the device **503** has been selected.

In step S**1503**, the device management and control file reading unit **904** loads a device management and control file **800** (FIGS. **8** and **9**), which has been stored in step S**1405** (FIG. **12**) based on the acquired device name. In step S**1504**, the device management control unit **902** executes processing for constructing a content to be displayed on the device management screen based on a device management and control file **800**. The processing for constructing a content to be displayed on the device management screen will be described in detail below with reference to FIG. **14**.

In step S**1505**, the device management control unit **902** displays the device management screen **600** via the display unit **901** according to the content to be displayed on the device management screen, which is constructed in step S**1504**. In step S**1506**, the processing for launching the device management screen by the device management application **80** ends.

FIG. **14** is a flow chart illustrating an example of processing for constructing a content to be displayed on the device management screen. A program of the processing according to the flow chart of FIG. **14** is loaded and executed by the CPU **204** from the HDD **202** on the RAM **201**.

When the processing for constructing a content to be displayed on the device management screen in step S**1504** illustrated in FIG. **13** is executed, the processing in the flow chart of FIG. **14** starts. Referring to FIG. **14**, in step S**1201**, the device management control unit **902** starts the processing for constructing a content to be displayed on the device management screen.

In step S**1202**, the device management control unit **902** constructs a printer queue button **604** according to the content of the element <dm:name> **805** (FIG. **8**) and the element <dm:execute> **806** (FIG. **8**). Instep S**1203**, the device management control unit **902** constructs a print setting button **605** according to the content of the element <dm:name> **807** (FIG. **8**) and the element <dm:execute> **808** (FIG. **8**).

In step S**1204**, the device management control unit **902** confirms the status of connection of a scanner and the status of installation of the corresponding driver according to the content of the element <dm:device> **811** (FIG. **8**) and the element <dm:available> **812** (FIG. **8**). In step S**1205**, the device management control unit **902** determines whether a scanner (the MFP **3**) has been connected and the corresponding driver has been installed. If it is determined that the MFP **3** has been connected to the PC **1** via the USB interface **14** and the IHV WIA driver **704** manufactured by ABC Corporation has been installed (YES in step S**1205**), then the processing advances to step S**1206**. Furthermore, if it is determined that the MFP **3** has been connected to the PC **1** via the network **4** by using WSD and that the standard WIA driver **703**, which is included in the OS as standard, has been installed (YES in step S**1205**), then the processing advances to step S**1206**. In none of the above cases (NO in step S**1205**), then the processing advances to step S**1207**.

In step S**1206**, the device management control unit **902** constructs a reading (WIA) button **610** according to the content of the element <dm:name> **809** (FIG. **8**) and the element <dm:execute> **813** (FIG. **8**). The processing in step S**1206** is executed in the case where an image can be read by using the IHV WIA driver **704** or the standard WIA driver **703** via USB connection or via the network that uses WSD.

In step S**1207**, the device management control unit **902** confirms the status of connection of a storage function and the status of installation of the corresponding driver according to the content of the element <dm:device> **815** (FIG. **8**) and the element <dm:available> **816** (FIG. **8**). Alternatively, in step S**1207**, the device management control unit **902** confirms the status of connection of a storage function and the status of installation of the corresponding driver according to the content of the element <dm:device> **819** (FIG. **8**) and the element <dm:available> **820** (FIG. **8**).

In step S**1208**, the device management control unit **902** determines whether a storage function has been connected and whether the corresponding driver has been installed. If it is determined that the MFP **3** has been connected to the PC **1** via the USB interface **14** and that a storage class driver, which is included in the OS as standard, has been installed (YES in step S**1208**), then the processing advances to step S**1209**. On the other hand, if it is determined that the MFP **3** has been connected to the PC **1** not via the USB interface **14** and that no storage class driver has been installed (NO in step S**1208**), then the processing advances to step S**1210**.

In step S**1209**, the device management control unit **902** constructs a reading (TWAIN) button **611** for USB connection according to the content of the element <dm:name> **814** (FIG. **8**) and the element <dm:execute> **817** (FIG. **8**). The processing in step S**1209** is executed in the case where an image can be read by the TWAIN driver **141** via USB connection.

In step S**1210**, the device management control unit **902** constructs a reading (TWAIN) button **611** for a connection method selected by the user via the scanner selection dialog **625** (FIG. **6**D) according to the content of the element <dm:name> **818** (FIG. **8**) and the element <dm:execute> **821** (FIG. **8**). The processing in step S**1210** is executed in the case where an image cannot be read by the TWAIN driver **141** via USB connection. More specifically, in this case, the connection between the PC **1** and the MFP **3** is implemented not via the USB interface **14** or the network **4**.

In this case, it is useful if the TWAIN application **142** is launched in a state where the TWAIN application **142** has at first displayed the scanner selection dialog **625** (FIG. **6**D) and where the TWAIN driver selected by the user is set in the scanner selection field **621**. Accordingly, the device management control unit **902** constructs a reading (TWAIN) button **611**, which is a button for displaying the scanner selection dialog **625** (FIG. **6**D).

In step S**1211**, the device management control unit **902** confirms the status of connection of a printer and the status of installation of the corresponding driver according to the content of the element <dm:device> **823** (FIG. **8**), the element <dm:available> **824** (FIG. **8**), and the element <dm:port> **825** (FIG. **8**). In step S**1212**, the device management control unit **902** determines whether a printer has been connected and whether the corresponding driver has been installed.

If it is determined that the MFP **3** has been connected to the PC **1** via the network **4** by using WSD and that the printer driver **50** has been installed (YES in step S**1212**), then the processing advances to step S**1213**. On the other hand, if it is determined that the MFP **3** has been connected to the PC **1** not via the network **4** by using WSD and that the printer driver **50** has not been installed yet (NO in step S**1212**), then the processing advances to step S**1214**.

In step S**1213**, the device management control unit **902** constructs a reading (TWAIN) button **611** for network connection that uses WSD according to the content of the element <dm:name> **822** (FIG. **8**) and the element <dm:execute> **826** (FIG. **8**). The processing in step S**1213** is executed if an image can be read by the TWAIN driver **141** via the network connection that uses WSD.

In step S**1214**, the device management control unit **902** confirms the status of connection of a printer and the status of installation of the corresponding driver according to the content of the element <dm:device> **828** (FIG. **9**), the element <dm:available> **829** (FIG. **9**), and the elements <dm:port> **830** through **837** (FIG. **9**). In step S**1215**, the device management control unit **902** determines whether a printer has been connected and whether the corresponding driver has been installed.

If it is determined that the MFP **3** has been connected to the PC **1** via the network **4** by using the IHV native protocol and that the printer driver **50** has been installed (YES in step S**1215**), then the processing advances to step S**1216**. On the other hand, if it is determined that the MFP **3** has been connected to the PC **1** not via the network **4** by using the IHV native protocol and that the printer driver **50** has not been installed yet (NO in step S**1215**), then the processing advances to step S**1217**. In step S**1217**, the processing for constructing the content to be displayed on the device management screen ends.

In step S**1216**, the device management control unit **902** constructs a reading (TWAIN) button **611** for network connection that uses the IHV native protocol according to the content of the element <dm:name> **827** (FIG. **9**) and the element <dm:execute> **838** (FIG. **9**). The processing in step S**1216** is executed if an image can be read by the TWAIN driver **141** via the network connection that uses the IHV native protocol. Then, the processing advances to step S**1217**. In step S**1217**, the processing for constructing the content to be displayed on the device management screen ends.

FIG. **15** is a flow chart illustrating an example of processing for launching the TWAIN application. A program of the processing of the flow chart illustrated in FIG. **15** is loaded and executed by the CPU **204** from the HDD **202** on the RAM **201**.

When the user presses the reading (TWAIN) button **611** via the device management screen **600** (i.e., when the user gives an instruction for starting image reading processing), the processing according to the flow chart of FIG. **15** starts. Referring to FIG. **15**, in step S**1101**, the processing for launching the TWAIN application **142** starts.

More specifically, in step S**1101**, the device management control unit **902**, which is included in the device management application **80** illustrated in FIG. **10**, transmits the information described in the element <dm:execute> **817**, **821**, **826**, or **838** (FIGS. **8** and **9**) to the application control unit **907** via the link execution unit **903**. In step S**1102**, the application control unit **907** acquires device designation information, which is described by using the name of the TWAIN driver that is a first argument. In step S**1103**, to confirm the name of the TWAIN driver that is the first argument, the application control unit **907** determines whether device designation information exists (i.e., whether a device has been designated). If it is determined that a device has been designated (i.e., that device designation information exists) (YES in step S**1103**), then the processing advances to step S**1111**. On the other hand, if it is determined that no device has been designated (i.e., that no device designation information exists) (NO in step S**1103**), then the processing advances to step S**1105**.

In the present exemplary embodiment, the device is designated by using the name of the TWAIN driver that is the first argument, which is described in the element <dm:execute> **817**, **821**, **826**, or **838** (FIGS. **8** and **9**). Accordingly, in this case, the processing advances from step S**1103** to step S**1111**. If the TWAIN application **142** has been launched without setting a first argument, then the processing advances from step S**1103** to step S**1105**.

In step S**1111**, the application control unit **907** determines whether the TWAIN driver name, which is the first argument, has a value "" ("null") (i.e., whether the device is an unknown device). If it is determined that the TWAIN driver name, which is the first argument, has a value "" ("null") (i.e., that the device is an unknown device) (YES in step S**1111**), then the processing advances to step S**1112**. On the other hand, if it is determined that the TWAIN driver name does not have a value "" ("null") (i.e., that the device is not an unknown device) (NO in step **S1111**), then the processing advances to step **S1104**. In step **S1112**, the application control unit **907** displays the scanner selection dialog **625** (FIG. **6**D). When the user selects a TWAIN driver via the scanner selection field **626** and presses the OK button **627**, the application control unit **907** sets the scanner designated with the name of the selected TWAIN driver as the first argument. Then, the processing advances to step S**1104**.

In step S**1104**, the default device setting unit **908** sets the designated device (i.e., the scanner designated by using the TWAIN driver name) as the default device for the TWAIN application **142**. Then, the processing advances to step S**1109**. In step S**1105**, the application control unit **907** transmits the information received from the device management control unit **902** via the link execution unit **903** in step S**1101** to the launching source determination unit **906**. The information transmitted from the application control unit **907** to the launching source determination unit **906** in step S**1105** is the information described in the element <dm:execute> **817**, **821**, **826**, or **838** illustrated in FIGS. **8** and **9**. More specifically, in step S**1105**, the launching source determination unit **906** acquires information about the launching source, which is a second argument.

In step S**1106**, the launching source determination unit **906** determines whether the launching source is the device management screen. If it is determined that the launching source is the device management screen (the device management screen **600** in the present exemplary embodiment) (YES in step S**1106**), then the processing advances to step S**1104**. On the other hand, if it is determined that the launching source is a portion other than the device management screen (NO in step S**1106**), then the processing advances to step S**1107**.

In the present exemplary embodiment, the device management screen **600** is designated as the launching source according to the second argument ("/devmnb"), which is described in the element <dm:execute> **817**, **821**, **826**, or **838** illustrated in FIGS. **8** and **9**. Accordingly, in this case, the processing advances from step S**1106** to step S**1104**. On the other hand, if it is determined that the TWAIN application **142** has been launched from a portion other than the device management screen (NO in step S**1106**), the processing advances from step S**1106** to step S**1104** because "/other" has been designated as the second argument, which corresponds to the launching source.

In step S**1107**, the default device setting unit **908** acquires information about a default device of the OS via the application/DDI interface **84**. In the present exemplary embodiment, the "default device" refers to a device to which the default mark **502** has been set in the folder **500** illustrated in FIG. **5**A. More specifically, in the present exemplary embodiment, because the device **501** ("XYZ Defg") has been set as the default device, the default device setting unit **908** acquires the device name "XYZ Defg" in step S**1107**.

In step S**1108**, the default device setting unit **908** sets the device (driver) name as the default device of the TWAIN application **142** according to the default device of the OS acquired in step S**1107**. Then the processing advances to step S**1109**. In step S**1108**, if the default device setting unit **908** cannot extract an appropriate device (driver) name from the default device of the OS acquired in step S**1107**, then the default device setting unit **908** sets the device (driver) name set in a previous launch of the TWAIN application **142** as the default device.

In step S**1109**, the application control unit **907** displays the TWAIN application **142**. In step S**1110**, the processing for launching the TWAIN application ends. In this case, the TWAIN application **142** has been launched and displayed in the state in which the default device set in step S**1108** is selected. The information about the default device for the TWAIN application **142** is stored on a memory of the RAM **201**, which is managed by the TWAIN application **30**.

Now, a second exemplary embodiment of the present invention will be described in detail below. FIGS. **16**A and **16**B illustrate an example of a device management screen and a manual therefor. In the example illustrated in FIG. **16**A, components similar to those of the first exemplary embodiment described above with reference to FIG. **5**B are provided with the same reference numerals. Accordingly, the description thereof will not be repeated here.

Referring to FIG. **16**A, a device management screen **1770** is launched and displayed when the user selects the device **503** via the Devices and Printers folder **500**. The user can manage the MFP **3** via the device management screen **1770**.

In the lower portion of the device management screen **1770**, a link to the function associated with the device **503** is displayed. More specifically, a printer queue button **604**, a print setting button **605**, and a manual display button **1780** are displayed.

In an element <dm:functions> **1781** (FIGS. **17** and **18**), elements <dm:function> **804**, **839**, **1701**, **1706**, **1711**, **1716**, **1721**, **1726**, **1731**, and **1736**, each of which describing each corresponding button and function, are described. The manual display button **1780** is a button for displaying a manual **1771** (FIG. **16**B), which describes how to operate the MFP **3**. When the user presses the manual display button **1780**, the manual **1771**, which has been previously installed at a predetermined location within the PC **1**, is launched and displayed.

Referring to FIG. **16**B, the manual **1771** is a manual describing how to operate the MFP **3**. The manual **1771** includes a Compiled Help Module (CHM) file (Manual.chm). More specifically, the manual **1771**, which depends on the model of the MFP **3** and the language used thereon, is installed by a dedicated setup application at the following predetermined location. In addition, the setup application describes a file path to the installation location of the manual **1771** as the following registry information (text string (Type: REG_SZ)).

```
[Case Where the OS is installed on C Drive And English is Used
as the Language of the OS]
    Installation location:
        C:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
    Registry information:
        HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC
        Kmmn¥
    Name Data
    manual_path:
        C:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
[Case Where the OS is installed on E Drive And Japanese is Used
as the Language of the OS]
    Installation location:
        E:¥Program Files¥ABC¥ABC Kmmn¥Japanese¥Manual.chm
    Registry information:
        HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC
        Kmmn¥
    Name Data
    manual_path:
        E:¥Program Files¥ABC¥ABC Kmmn¥Japanese¥Manual.chm
[Case Where the OS is installed on H Drive And Arabic is Used
as the Language of the OS]
    Installation location:
        H:¥Program Files¥ABC¥ABC Kmmn¥Arabic¥Manual.chm
    Registry information:
        HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC
        Kmmn¥
    Name Data
```

-continued

```
    manual_path:
        H:¥Program Files¥ABC¥ABC Kmmn¥Arabic¥Manual.chm
[Case Where the OS is installed on K Drive And Russian is Used
as the Language of the OS]
    Installation location:
        K:¥Program Files¥ABC¥ABC Kmmn¥Russian¥Manual.chm
    Registry information:
        HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC
        KmmnY
    Name Data
    manual_path:
        K:¥Program Files¥ABC¥ABC Kmmn¥Russian¥Manual.chm
```

In launching the manual **1771** from another application, the user generally acquires a full path to the manual **1771** based on the registry information and launches the manual **1771** by using the full path. In the present exemplary embodiment, manuals of four language versions, i.e., English, Japanese, Arabic, and Russian versions, are provided as the manual for the MFP **3**.

FIGS. **17** and **18** illustrate an example of a content of the device management and control file. Referring to FIG. **17**, a device management and control file **1700** is a file for the OS whose language is English. Information illustrated in FIGS. **17** and **18** is stored on the file storage portion **11** or the file storage portion **12**. The content of the examples illustrated in FIG. FIGS. **17** and **18** that is similar to that described above in the first exemplary embodiment with reference to FIGS. **8** and **9** will not be repeatedly described in detail.

Referring to FIG. **17**, information used for constructing the device management screen **1770** is described in the device management and control file **1700**. On the device management screen **1770**, which is launched and displayed when the MFP **3** is connected to the PC **1**, in order to display the buttons illustrated in FIGS. **16**A and **16**B (i.e., the printer queue button **604**, the print setting button **605**, and the manual display button **1780**), elements <dm:function> **804**, **839**, **1701**, **1706**, **1711**, **1716**, **1721**, **1726**, **1731**, and **1736**, each of which describing each corresponding button and function, are described in the element <dm:functions> **1781**.

In an element <dm:name xml:lang="en-US">On-screen Manual</dm:name> **1702** included in the element <dm:function> **1701**, a text string "On-screen Manual", which is displayed on the manual display button **1780**, is set. In an element <dm:required> **1703**, information about a condition for displaying the manual display button **1780** is set.

The element <dm:keyword In Registry> **1704** describes that the following information has been set as the registry information:

```
Registry information:
    HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC Kmmn¥
Name Data
manual_path:
    A:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
```

In the above-described case, the OS is installed on the A drive and English has been set as the default language of the OS.

In the examples illustrated in FIGS. **17** and **18**, "HKLM" is abbreviation for "HKEY_LOCAL_MACHINE". The text string "HKLM" is converted into "HKEY_LOCAL_MACHINE" within the OS to be processed.

If the OS has been installed on the A drive and English is used as the default language of the OS and if an English version of the manual **1771** has been installed, then a full path to the manual **1771** is set in an element <dm:execute> **1705**.

In an element <dm:name xml:lang="en-US">On-screen Manual</dm:name> **1707** included in the element <dm:function> **1706**, a text string "On-screen Manual" is set, which is displayed on the manual display button **1780**.

Information about a condition for displaying the manual display button **1780** is set in an element <dm:required> **1708**. An element <dm:keyword In Registry> **1709** describes that the following information has been set as the registry information:

```
Registry information:
    HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC Kmmn¥
Name Data
manual_path:
    B:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
```

In the above-described case, the OS is installed on the B drive and English has been set as the default language of the OS.

If the OS has been installed on the B drive and English is used as the default language of the OS and if an English version of the manual **1771** has been installed, then a full path to the manual **1771** is set in an element <dm:execute> **1710**. For an element <dm:function> in the case where the OS has been installed on any of C through X drives and English is set as the default language of the OS, the information about the OS installation destination drive only is different from that in the case of the element <dm:function> **1701** and the element <dm:function> **1706**. Accordingly, the cases will not be illustrated in the drawing.

In an element <dm:name xml:lang="en-US">On-screen Manual</dm:name> **1712** included in the element <dm:function> **1711**, a text string "On-screen Manual" is set, which is displayed on to the manual display button **1780**. Information about a condition for displaying the manual display button **1780** is set in an element <dm:required> **1713**.

An element <dm:keyword In Registry> **1714** corresponds to the case where the following information has been set as the registry information:

```
Registry information:
    HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC Kmmn¥
Name Data
manual_path:
    Y:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
```

In the above-described case, the OS is installed on the Y drive and English has been set as the default language of the OS.

If the OS has been installed on the B drive and English is used as the default language of the OS and if an English version of the manual **1771** has been installed, then a full path to the manual **1771** is set in an element <dm:execute> **1715**. In an element <dm:name xml:lang="en-US">On-screen Manual</dm:name> **1717** included in the element <dm:function> **1716**, a text string "On-screen Manual" is set, which is displayed on the manual display button **1780**.

Information about a condition for displaying the manual display button **1780** is set in an element <dm:required> **1718**. The element <dm:keyword In Registry> **1719** describes that the following information has been set as the registry information:

```
Registry information:
    HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC Kmmn¥
Name Data
manual_path:
    Z:¥Program Files¥ABC¥ABC Kmmn¥English¥Manual.chm
```

In the above-described case, the OS is installed on the Z drive and English has been set as the default language of the OS.

If the OS has been installed on the Z drive and English is used as the default language of the OS and if an English version of the manual **1771** has been installed, then a full path to the manual **1771** is set in an element <dm:execute> **1720**.

The OS can be logically installed on any of A through Z drives. In the present exemplary embodiment, the elements <dm:function> **1701** through **1716** described above are provided. Accordingly, if the OS has been installed on an arbitrary drive among the A through Z drives, the manual display button **1780** can be normally displayed. In addition, when the user presses the manual display button **1780**, the present exemplary embodiment can normally display the English manual **1771**. Accordingly, the present exemplary embodiment can achieve a high user operability.

In the present exemplary embodiment, it is supposed that English and Japanese versions are provided for the device management and control file **1700**. In the Japanese version of the device management and control file **1700**, the text string "English" is substituted with another text string "Japanese". More specifically, focusing on the element <dm:function> **1701**, the device management and control file **1700** includes the following content:

```
<dm:function>
<dm:name xml:lang="en-US">On-screen Manual</dm:name>
<dm:required>
<dm:keyword In Registry key="HKLM¥SOFTWARE¥ABC¥ABC
Kmmn"
name="manual_path">
A:¥Program Files¥ABC¥ABC Kmmn¥Japanese¥Manual.chm
</dm:keyword In Registry>
</dm:required>
<dm:execute>
A:¥Program Files¥ABC¥ABC Kmmn¥Japanese¥Manual.chm
</dm:execute>
</dm:function>
```

Accordingly, if the default language of the OS is Japanese and if the OS has been installed on any arbitrary driver among the A through Z drives, the present exemplary embodiment can normally display the manual display button **1780**. Therefore, when the user presses the manual display button **1780**, the present exemplary embodiment can normally display the Japanese version of the manual **1771**. Accordingly, the present exemplary embodiment can achieve a high user operability.

If any language other than English and Japanese is used as the default language of the OS, the device management and control file **1700** for the other language is not provided. Accordingly, the English version of the device management and control file **1700** is installed and referred to by the user as the device management and control file for the default language.

Therefore, if the default language of the OS is Arabic, whose manual **1771** is available, the manual display button **1780** for displaying the manual **1771** for Arabic or any languages other than English and Japanese cannot be displayed according to the elements <dm:function> **1701** through **1716**. In other words, elements <dm:function> **1721** through **1736** (FIG. **18**) are to be provided, which are elements dedicated for languages whose manual **1771** has been provided but whose device management and control file **1700** has not been provided.

In an element <dm:name xml:lang="en-US">On-screen Manual</dm:name> **1722** included in the element <dm:function> **1721**, a text string "On-screen Manual" is set, which is displayed on the manual display button **1780**. Information about a condition for displaying the manual display button **1780** is set in the element <dm:required> **1723**.

The element <dm:keyword In Registry> **1724** describes that the following information has been set as the registry information:

```
Registry information:
    HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC Kmmn¥
Name Data
manual_path:
    A:¥Program Files¥ABC¥ABC Kmmn¥Arabic¥Manual.chm
```

In the above-described case, the OS is installed on the A drive and Arabic has been set as the default language of the OS.

If the OS has been installed on the A drive and Arabic is used as the default language of the OS and if an Arabic version of the manual **1771** has been installed, then a full path to the manual **1771** is set in the element <dm:execute> **1725**. For an element <dm:function> in the case where the OS has been installed on any of B through Y drives and Arabic is set as the default language of the OS, the information about the OS installation destination drive only is different from that in the case of the element <dm:function> **1721**. Accordingly, the cases will not be illustrated in the drawing.

In an element <dm:name xml:lang="en-US">On-screen Manual</dm:name> **1727** included in the element <dm:function> **1726**, a text string "On-screen Manual" is set, which is displayed on the manual display button **1780**. Information about a condition for displaying the manual display button **1780** is set in the element <dm:required> **1728**.

The element <dm:keyword In Registry> **1729** describes that the following information has been set as the registry information:

```
Registry information:
    HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC Kmmn¥
Name Data
manual_path:
    Z:¥Program Files¥ABC¥ABC Kmmn¥Arabic¥Manual.chm
```

In the above-described case, the OS is installed on the Z drive and Arabic has been set as the default language of the OS.

If the OS has been installed on the Z drive and Arabic is used as the default language of the OS and if an Arabic version of the manual **1771** has been installed, then a full path to the manual **1771** is set in an element <dm:execute> **1730**.

In an element <dm:name xml:lang="en-US">On-screen Manual</dm:name> **1732** included in the element <dm:function> **1731**, a text string "On-screen Manual" is set, which is displayed on the manual display button **1780**. Information about a condition for displaying the manual display button **1780** is set in the element <dm:required> **1733**.

The element <dm:keyword In Registry> **1734** describes that the following information has been set as the registry information:

```
Registry information:
    HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC Kmmn¥
Name Data
manual_path:
    A:¥Program Files¥ABC¥ABC Kmmn¥Russian¥Manual.chm
```

In the above-described case, the OS is installed on the A drive and Russian has been set as the default language of the OS.

If the OS has been installed on the A drive and Russian is used as the default language of the OS and if a Russian version of the manual **1771** has been installed, then a full path to the manual **1771** is set in the element <dm:execute> **1735**. For an element <dm:function> in the case where the OS has been installed on any of B through Y drives and Russian is set as the default language of the OS, the information about the OS installation destination drive only is different from that in the case of the element <dm:function> **1731**. Accordingly, the cases will not be illustrated in the drawing.

In an element <dm:name xml:lang="en-US">On-screen Manual</dm:name> **1737** included in the element <dm:function> **1736**, a text string "On-screen Manual" is set, which is displayed on the manual display button **1780**. Information about a condition for displaying the manual display button **1780** is set in an element <dm:required> **1738**.

The element <dm:keyword In Registry> **1739** describes that the following information has been set as the registry information:

```
Registry information:
    HKEY_LOCAL_MACHINE¥SOFTWARE¥ABC¥ABC Kmmn¥
Name Data
manual_path:
    Z:¥Program Files¥ABC¥ABC Kmmn¥Russian¥Manual.chm
```

In the above-described case, the OS is installed on the Z drive and Russian has been set as the default language of the OS.

If the OS has been installed on the Z drive and Russian is used as the default language of the OS and if a Russian version of the manual **1771** has been installed, then a full path to the manual **1771** is set in an element <dm:execute> **1740**.

As in the case where Arabic or Russian has been set as the default language in the present exemplary embodiment, the present exemplary embodiment having the above-described configuration particularly provides the elements <dm:function> **1721** through **1736** (FIG. **18**), which are elements dedicated for languages whose manual **1771** has been provided but whose device management and control file **1700** has not been provided.

Accordingly, if any arbitrarily selected language other than English and Japanese has been set as the default language of the OS, the present exemplary embodiment can normally display the manual display button **1780**. Therefore, when the user presses the manual display button **1780**, the present exemplary embodiment can normally display the appropriate version of the manual **1771** corresponding to the language other than English and Japanese. Accordingly, the present exemplary embodiment can achieve a high user operability.

For the languages other than English and Japanese, the OS can be logically installed on any of A through Z drives. In the present exemplary embodiment, the elements <dm:function> **1721** through **1726** and **1731** through **1736** described above are provided. Accordingly, if the OS has been installed on an arbitrary drive among the A through Z drives, the manual display button **1780** can be normally displayed. In addition, when the user presses the manual display button **1780**, the present exemplary embodiment can normally display the appropriate version of the manual **1771** corresponding to the default language of the OS. Accordingly, the present exemplary embodiment can achieve a high user operability.

FIG. **19** is a flow chart illustrating an example of processing for constructing a content to be displayed on the device management screen. A program of the processing according to the flow chart of FIG. **19** is loaded and executed by the CPU **204** from the HDD **202** on the RAM **201**.

When the processing for constructing a content to be displayed on the device management screen in step S**1504** illustrated in FIG. **13** is executed, the processing in the flow chart of FIG. **19** starts. Referring to FIG. **19**, in step S**1901**, the device management control unit **902** starts the processing for constructing a content to be displayed on the device management screen.

In step S**1902**, the device management control unit **902** constructs a printer queue button **604**. In step S**1903**, the device management control unit **902** constructs a print setting button **605**. In step S**1904**, the device management control unit **902** confirms the status of installation of a manual **1771** for a language that is the same as the default language set for the OS. In step S**1905**, the device management control unit **902** determines whether a manual **1771** for a language that is the same as the default language set for the OS has been installed. In the example illustrated in FIG. **17**, the element <dm:keyword In Registry> **1704** describes that the OS has been installed on the A drive.

If it is determined that a manual **1771** for a language that is the same as the default language set for the OS has been installed (YES in step S**1905**), then the processing advances to step S**1906**. On the other hand, if it is determined that a manual **1771** for a language that is the same as the default language set for the OS has not been installed yet (NO in step S**1905**), then the processing advances to step S**1907**.

In step S**1906**, the device management control unit **902** constructs a manual display button **1780** for displaying the manual **1771** for the language that is the same as the default language of the OS according to the content of the element <dm:name> **1702** (FIG. **17**) and the element <dm:execute> **1705** (FIG. **17**). The element <dm:name> **1702** and the element <dm:execute> **1705** illustrated in FIG. **17** correspond to the case where the OS has been installed on the A drive.

In step S**1907**, the device management control unit **902** confirms the installation status of the Arabic version of the manual **1771** according to the content of the element <dm: keyword In Registry> **1724** (FIG. **18**). The content of the element <dm:keyword In Registry> **1724** (FIG. **18**) corresponds to the case where the OS has been installed on the A drive. In step S**1908**, the device management control unit **902** determines whether the Arabic version of the manual **1771** has been installed. If it is determined that the Arabic version of the manual **1771** has been installed (YES in step S**1908**), then the processing advances to step S**1909**. On the other hand, if it is determined that the Arabic version of the manual **1771** has not been installed (NO in step S**1908**), then the processing advances to step S**1910**.

In step S**1909**, the device management control unit **902** constructs a manual display button **1780** for displaying the Arabic version of the manual **1771** according to the content of the element <dm:name> **1722** (FIG. **18**) and the element <dm:execute> **1725** (FIG. **18**). The element <dm:name> **1722** and the element <dm:execute> **1725** illustrated in FIG. **18** correspond to the case where the OS has been installed on the A drive.

In step S**1910**, the device management control unit **902** confirms the installation status of the Russian version of the manual **1771** according to the content of the element <dm: keyword In Registry> **1734** (FIG. **18**). The element <dm: keyword In Registry> **1734** illustrated in FIG. **18** corresponds to the case where the OS has been installed on the A drive. In step S**1911**, the device management control unit **902** determines whether the Russian version of the manual **1771** has been installed.

If it is determined that the Russian version of the manual **1771** has been installed (YES in step S**1911**), then the processing advances to step S1912. On the other hand, if it is determined that the Russian version of the manual 1771 has not been installed (NO in step S1911), then the processing advances to step S1913. In step S1913, the processing for constructing the content to be displayed on the device management screen ends.

In step S1912, the device management control unit 902 constructs a manual display button 1780 for displaying the Russian version of the manual 1771 according to the content of the element <dm:name> 1732 (FIG. 18) and the element <dm:execute> 1735 (FIG. 18). Then, the processing advances to step S1913. In step S1913, the processing for constructing the content to be displayed on the device management screen ends. The element <dm:name> 1732 and the element <dm:execute> 1735 illustrated in FIG. 18 correspond to the case where the OS has been installed on the A drive.

In the above-described first exemplary embodiment, the MFP 3, which includes the functions of a color inkjet printer, a color facsimile apparatus, and a color scanner, and an external storage device for a flash memory is used as an example of a peripheral apparatus. In addition, the above-described first exemplary embodiment provides a function of an appropriate device according to the environment of use by the user by utilizing statuses and port names described in the following items (1) through (4):

(1) A state in which the storage function, which is different from and not related to the scanner function, is available

(2) A state in which the storage function, which is different from and not related to the scanner function, is not available

(3) A state in which the storage function, which is different from and not related to the scanner function, is available and the port name of the port used for the printer function

(4) A state in which the storage function, which is different from and not related to the scanner function, is available and exclusive OR for the port name of the port used for the printer function

However, if an MFP that does not include an external storage device but includes a printer and a scanner only, an MFP that does not include a printer but includes a scanner, a facsimile apparatus, and an external storage device only, or a single-function color scanner which does not include functions of a printer and an external storage device, is used as an example of the peripheral apparatus, then the purpose of the present invention cannot be achieved by the above-described first exemplary embodiment.

In a third exemplary embodiment of the present invention, a peripheral apparatus control system including an arbitrary peripheral apparatus, such as the above-described MFP or a single-function scanner that can implement the present invention will be described. In the third exemplary embodiment described below, it is supposed that the MFP 3 is a single-function scanner that does not include a printer function or an external storage device.

FIG. 20 illustrates an example of a device management and control file. Referring to FIG. 20, a device management and control file 950 is a file for an English OS. Information illustrated in FIG. 20 is stored in the file storage portions 11 and 12. The content of the information illustrated in FIG. 20 that is the same as that of the information illustrated in FIG. 8 will not be described in detail here again.

In an element <dm:name xml:lang="en-US">Image Scan (TWAIN) </dm:name> 952 included IN an element <dm:function> 951, a text string "Image Scan (TWAIN)" to be displayed on the reading (TWAIN) button 611 is set. In an element <dm:required> 953, information describing a condition for displaying the reading (TWAIN) button 611 is set. In an element <dm:keywordInRegistry key="HKCU\Software\ABC\Network Utility\Kmmn" name="active" option="Equal"></dm:keywordInRegistry> 954, registry information is set as the above-described condition. More specifically, a code "Equal", which is designated as an "option" attribute, means "not matching ". Accordingly, if the registry information included in the element <dm:keywordInRegistry key="HKCU\Software\ABC\Network Utility\Kmmn" name="active" option="Equal"></dm:keywordInRegistry> 954 does not match the following Registry information, then the reading (TWAIN) button 611 is displayed:

```
    HKEY_CURRENT_USER_MACHINE\Software\ABC\Network
Utility\Kmmn\
    Name: active
    Type: REG_SZ
    Data: none
```

More specifically, if an arbitrary value, such as "0", "1", or "2" is set to the apparatus "active", then the reading (TWAIN) button 611 is displayed.

In an element<dm:execute>TWAINScan.exe "ABC Kmmn (TWAIN)"/devmng</dm:execute> 955, a code "TWAINScan.exe"ABCKmmn(TWAIN)"/devmng", which describes the function (program) for launching the TWAIN application 142 is set. Accordingly, if the reading (TWAIN) button 611 is pressed by the user, the TWAIN application 142 is launched in a state where the code "ABC Kmmn (TWAIN)", which denotes the TWAIN driver 141 used via USB connection has been set as the default scanner (driver). Accordingly, the present exemplary embodiment can improve the user operability.

In an element <dm:name xml:lang="en-US">Image Scan (TWAIN)—Select Device</dm:name> 957 included in an element <dm:function> 956, a text string "Image Scan (TWAIN)—Select Device" to be displayed on the reading (TWAIN) button 611 is set. Because the text string set to the element <dm:name> is used as the text string displayed on the reading (TWAIN) button 611, the text string displayed on the reading (TWAIN) button 611 may be different from the text string illustrated in FIG. 5B.

Information describing a condition for displaying the reading (TWAIN) button 611 is set in an element <dm:required> 958. In an element <dm:keywordInRegistry key="HKCU¥Software¥ABC¥Network Utility¥Kmmn" name="active" option="equal">0 </dm:keywordInRegistry> 959, registry information is set as the above-described condition. More specifically, a code "equal", which is designated as an "option" attribute, means "matching". Accordingly, if the registry information included in the element <dm:keywordInRegistry key="HKCU¥Software\ABC¥Network Utility¥Kmmn" name="active" option="equal">0 </dm:keywordInRegistry> 959 matches the following registry information, then the reading (TWAIN) button 611 is displayed:

```
    HKEY_CURRENT_USER_MACHINE¥Software¥ABC¥Network
Utility¥Kmmn¥
    Name: active
    Type: REG_SZ
    Data: 0
```

More specifically, if the value "0" is set to the apparatus "active", the reading (TWAIN) button 611 is displayed.

In an element <dm:execute>TWAINScan.exe ""/devmng</dm:execute> 960, the code "TWAINScan.exe

“”/devmng”, which denotes the function (program) for launching the TWAIN application **142** is set. Accordingly, if the reading (TWAIN) button **611** is pressed by the user, the TWAIN application **142** is launched in the following manner.

More specifically, at first, in a state where the scanner selection dialog **625** (FIG. **6**D) is displayed and the TWAIN driver selected by the user is set in the scanner selection field **621**, the TWAIN application **142** is launched. By executing the above-described processing, the user is enabled to appropriately designate a scanner (driver) desired to be used even when the user has not yet prepared or set the scanner desired to be used. Accordingly, the present exemplary embodiment can achieve a high user operability.

In an element <dm:name xml:lang=“en-US”>Image Scan (TWAIN) </dm:name> **962** included in an element <dm:function> **961**, a text string “Image Scan (TWAIN)” is set to the reading (TWAIN) button **611**. In an element <dm:required> **963**, information describing a condition for displaying the reading (TWAIN) button **611** is set.

In an element <dm:keywordInRegistry key=“HKCU¥Software¥ABC¥Network Utility¥Kmmn” name=“active” option=“greater”>0</dm:keywordInRegistry> **964**, registry information is set as the above-described condition. In addition, a code “greater”, which is designated as the “option” attribute, means “greater than . . . ”. Accordingly, if a value greater than the value of the following registry information is set, the reading (TWAIN) button **611** is displayed:

```
    HKEY_CURRENT_USER_MACHINE¥Software¥ABC¥Network
Utility¥Kmmn¥
    Name: active
    Type: REG_SZ
    Data: 0
```

More specifically, if a value greater than “0” is set to the apparatus “active”, then the reading (TWAIN) button **611** is displayed.

In an element <dm:execute>TWAINScan.exe “ABC Kmmn (TWAIN) Network”/devmng</dm:execute> **965**, a code “TWAINScan.exe” ABC Kmmn (TWAIN) Network”/devmng”, which describes the function (program) for launching the TWAIN application **142**, is set. Accordingly, if the reading (TWAIN) button **611** is pressed by the user, the TWAIN application **142** is launched in the following manner.

More specifically, the TWAIN application **142** is launched in a state where a code “ABCKmmn (TWAIN) Network”, which denotes the TWAIN driver **141** used via network connection by IHV native protocol, is set as the default scanner (driver). Accordingly, the present exemplary embodiment can improve the user operability.

FIG. **21** illustrates an example of a network utility. Referring to FIG. **21**, a network utility **630**, which is software, periodically executes polling to acquire the status of the device to monitor a push scan event or a status event from the device within the network **4**, such as the MFP **3**. In the example illustrated in FIG. **21**, a main window of the network utility **630** is displayed.

A short cut for launching the network utility **630** is registered in a startup folder as one of programs started while booting the OS. When the OS is booted, the network utility **630** is launched and operates as a resident program. A device display field **631** displays the device monitored by the network utility **630**.

Each of device names **632**, **634**, and **646** denotes a device name of the monitoring target device within the network **4**.

More specifically, the device name **632** of the MFP **3** includes a MAC address of the MFP **3** “aabbcckmmn08”. The device name **634** corresponds to an MFP having the same model name as that of the MFP **3** and a serial number different from that of the MFP **3**. The MFP has a MAC address “aabbcckmmn14”. The device name **636** corresponds to an MFP of ABC Corporation having the model name “Opqr”. The MFP has a MAC address “aabbccopqr01”.

If any of monitoring target device check boxes **633**, **635**, and **637** has been checked, the network utility **630** monitors the corresponding device. On the other hand, the network utility **630** does not monitor a device whose corresponding monitoring target device check box is not checked.

In the example illustrated in FIG. **21**, the network utility **630** monitors the MFP **3**, which is displayed as having the device name “ABC Kmmn aabbcckmmn08” only. Referring to FIG. **21**, when the user presses an OK button **638**, the network utility **630** stores the setting of each of the monitoring target device check boxes **633**, **635**, and **637**. Furthermore, in this case, the network utility **630** closes its main window.

When the user presses a cancel button **639**, the main window of the network utility **630** is closed. More specifically, if the user presses the cancel button **639**, the network utility **630** does not store the setting of each of the monitoring target device check box **633**, **635**, and **637**. Even after the user has pressed the OK button **638** or the cancel button **639** and thus the main window is closed, the network utility **630** operates as a resident program operating on the PC **1** and continues monitoring the device existing within the network **4**.

FIG. **22** is a flow chart illustrating an example of processing executed by using the network utility. A program of the processing illustrated in the flow chart of FIG. **22** is implemented by the CPU **204** by loading the program from the HDD **202** on the RAM **201**.

When the OS is booted and the function of the shortcut for launching the network utility **630**, which is registered in the startup folder, is executed, the processing in the flow chart of FIG. **22** starts. Referring to FIG. **22**, in step S**2201**, the network utility **630** is launched and starts the processing illustrated in FIG. **22**.

In step S**2202**, the network utility **630** confirms the monitoring target device existing within the network **4** according to the setting of each of the monitoring target device check boxes **633**, **635**, and **637**. In step S**2203**, the network utility **630** determines whether a device **1** (i.e., the device displayed with the device name **632** in the example illustrated in FIG. **21**) is a monitoring target device. If it is determined that the device **1** is a monitoring target device (YES in step S**2203**), then the processing advances to step S**2204**. On the other hand, if it is determined that the device **1** is not a monitoring target device (NO in step S**2203**), then the processing advances to step S**2205**.

In step S**2204**, the network utility **630** launches a polling thread for the device **1**, which is used for monitoring the device **1**. In step S**2205**, the network utility **630** determines whether a device **2** (i.e., a device displayed with the device name **634** in the example illustrated in FIG. **21**) is a monitoring target device. If it is determined that the device **2** is a monitoring target device (YES in step S**2205**), then the processing advances to step S**2206**. On the other hand, if it is determined that the device **2** is not a monitoring target device (NO in step S**2205**), then the processing advances to step S**2207**.

In step S**2206**, the network utility **630** launches a polling thread for the device **2**, which is used for monitoring the device **2**. In step S**2207**, the network utility **630** determines whether a device N (i.e., the device displayed with the device name **636** in the example illustrated in FIG. **21** when N=3) is a monitoring target device. If it is determined that the device N is a monitoring target device (YES in step S**2207**), then the processing advances to step S**2208**. On the other hand, if it is determined that the device N is not a monitoring target device (NO in step S**2207**), then the processing advances to step S**2209**.

In step S**2208**, the network utility **630** launches a polling thread for the device N, which is used for monitoring the device N. In step S**2209**, the network utility **630** determines whether a processing end message has been received from the OS. If it is determined that a processing end message has been received from the OS (YES in step S**2209**), then the processing advances to step S**2210**. In step S**2210**, the network utility **630** ends all the active polling threads for the active devices (the devices **1** through N) and ends the processing illustrated in FIG. **22**.

If it is determined that the network utility **630** has not received a processing end message from the OS yet (NO in step S**2209**), then the processing returns to step S**2202**. When the network utility **630** launches the polling thread for the device **1** through N in steps S**2204**, S**2206**, and S**2208**, if the device polling thread has already been launched and the device is currently monitored, the network utility **630** does not launch the device polling thread in an overlapped manner.

FIG. **23** is a flow chart illustrating an example of processing for polling a device N. The processing illustrated in FIG. **23** is implemented by the CPU **204** by loading and executing a corresponding program from the HDD **202** on the RAM **201**.

When the network utility **630** has launched the polling thread for a device N (N is an integer greater than 1) in steps S**2204**, S**2206**, and S**2208** illustrated in FIG. **22**, the processing illustrated in FIG. **23** starts. Referring to FIG. **23**, in step S**2301**, the network utility **630** starts the polling for the device N. In step S**2302**, the network utility **630** confirms the status of the device N. In step S**2303**, the network utility **630** determines whether the device N is online. If it is determined that the device N is online (YES in step S**2303**), then the processing advances to step S**2304**. On the other hand, if it is determined that the device N is not online (i.e., if it is determined that the device N is offline) (NO in step S**2303**), then the processing advances to step S**2305**.

In step S**2304**, the network utility **630** increments a value of the following registry information about the device N (i.e., the value of the apparatus "active") by 1 and then the processing advances to step S**2306**:

```
    HKEY_CURRENT_USER_MACHINE¥Software¥ABC¥Network
Utility¥<Device Name>¥
    Name: active
    Type: REG_SZ
```

In step S**2305**, the network utility **630** decrements the value of the registry information (i.e., the value of the apparatus "active" by 1. Then, the processing advances to step S**2306**. For the element <Device Name>, the model name of the device N is assigned. More specifically, the model name "Kmmn" is assigned to the element <Device Name> for the devices **1** and **2**. On the other hand, the model name "Opqr" is assigned to the element <Device Name> for the device **3**.

In step S**2306**, after the network utility **630** has waited for a predetermined time (in the present exemplary embodiment, the predetermined wait time of five seconds), then the processing returns to step S**2302**.

As described above, the information that describes the state of each of the devices **1** through N as to whether the device is online (or offline) is assigned to the value of the registry information (the value of the apparatus "active"). In the present exemplary embodiment, as a characteristic point of the present invention, the network utility **630** launches a polling thread for each device and increments or decrements the value of the apparatus "active" by 1 in steps S**2304** and S**2305**.

More specifically, if a plurality of devices having the same model name and different serial numbers exists within the network **4**, the network utility **630** is enabled to flawlessly monitor the state of all the monitoring target devices existing within the network **4** by assigning a device name including a MAC address, such as "Kmmn aabbcckmmn08" to the element <Device Name> included in the registry key of the registry information instead of simply assigning the model name.

On the other hand, because the device management and control file **950** includes previously generated static information as illustrated in FIG. **20**, it is difficult to describe registry information by using the model name to which a MAC address, which is to be identified from among a vast amount of MAC addresses, is added. In particular, description of the registry information by using the model name including a MAC address becomes difficult when a plurality of devices having the same model name (i.e., the device name such as the device names **632** and **634** displayed in the device display field **631**) and different serial numbers exists within the network **4**.

In this case, although not entirely flawlessly implemented, the present invention enables substantially correct monitoring of the state of the devices existing within the network **4** by causing the network utility **630** to launch a polling thread for each independent device and increments and decrements the value of the apparatus "active" by 1 in steps S**2304** and S**2305** in each device polling thread.

Accordingly, in the present exemplary embodiment, the user is enabled to launch the TWAIN application **142** in the state where the device desired to be used is selected as the default scanner (driver) in the scanner selection field **621**. Accordingly, the present exemplary embodiment can achieve a high user operability.

FIG. **24** is a flow chart illustrating an example of processing for constructing a content to be displayed on the device management screen. The processing illustrated in FIG. **24** is implemented by the CPU **204** by loading and executing a corresponding program from the HDD **202** on the RAM **201**.

When the processing for constructing the content to be displayed on the device management screen is executed in step S**1504** (FIG. **13**), the processing illustrated in the flow chart of FIG. **24** starts. Referring to FIG. **24**, in step S**2401**, the device management control unit **902** starts the processing for constructing the content to be displayed on the device management screen. In step S**2402**, the device management control unit **902** constructs a printer queue button **604** according to the content of the element <dm:name> **805** (FIG. **8**) and the element <dm:execute> **806** (FIG. **8**). In step S**2403**, the device management control unit **902** constructs a print setting button **605** according to the content of the element <dm:name> **807** (FIG. **8**) and the element <dm:execute> **808** (FIG. **8**).

In step S**2404**, the device management control unit **902** confirms the status of connection of a scanner and the status of installation of the corresponding driver according to the content of the element <dm:device> **811** (FIG. **8**) and the element <dm:available> **812** (FIG. **8**). If it is determined that the MFP **3** has been connected to the PC **1** via the USB interface **14** and that the IHV WIA driver manufactured by the manufacturer of the device (i.e., ABC Corporation) has been installed (YES in step S**2405**), then the processing advances to step S**2406**. Alternatively, if it is determined that the MFP **3** has been connected to the PC **1** via the network **4** by using the WSD connection and that the Standard WIA driver **703**, which is included in the OS as a standard function, has been installed (YES in step S**2405**), then the processing advances to step S**2406**. In a case different from those described above (NO in step S**2405**), then the processing advances to step S**2407**.

In step S**2406**, the device management control unit **902** constructs a reading (WIA) button **610** according to the content of the element <dm:name> **809** (FIG. **8**) and the element <dm:execute> **813** (FIG. **8**). The processing in step S**2406** is executed in the case where an image can be read by using the IHV WIA driver **704** or the standard WIA driver **703** via USB connection or via the network that uses WSD.

In step S**2407**, the device management control unit **902** confirms the value of the registry information (i.e., the value of the apparatus "active") according to the content of the element <dm:keywordInRegistry> **954** (FIG. **20**):

```
    HKEY_CURRENT_USER_MACHINE¥Software¥ABC¥Network
Utility¥<Device Name>¥
      Name: active
      Type: REG_SZ
```

If it is determined that no value has been set to the apparatus "active" (YES in step S**2408**), then the processing advances to step S**2409**. On the other hand, if it is determined that an arbitrary value, such as "0", "1", or "2", has been set (NO in step S**2408**), then the processing advances to step S**2410**.

In step S**2409**, the device management control unit **902** constructs the reading (TWAIN) button **611** for USB connection according to the content of the element <dm:name> **952** (FIG. **20**) and the element <dm:execute> **955** (FIG. **20**). In step S**2414**, the processing for constructing the content to be displayed on the device management screen ends. The processing in step S**2409** is executed in the case where an image can be read by using the TWAIN driver **141** via USB connection.

In step S**2410**, the device management control unit **902** determines whether the value of "active" is "0". If it is determined that the value of "active" is "0" (YES in step S**2410**), then the processing advances to step S**2411**. On the other hand, if it is determined that the value of "active" is not "0" (NO in step S**2410**), then the processing advances to step S**2412**.

In step S**2411**, the device management control unit **902** displays the scanner selection dialog **625** (FIG. **6**D) according to the content of the element <dm:name> **957** (FIG. **20**) and the element <dm:execute> **960** (FIG. **20**). Furthermore, the device management control unit **902** constructs the reading (TWAIN) button **611** for the connection method selected by the user. Then, the processing advances to step S**2414**. In step S**2414**, the processing for constructing the content to be displayed on the device management screen ends.

The processing in step S**2411** is executed in the case where an image cannot be read by the TWAIN driver **141** via USB connection. More specifically, in this case, the connection between the PC **1** and the MFP **3** is implemented not via the USB interface **14** or the network **4**.

In this case, it is useful if the TWAIN application **142** is launched in a state where the TWAIN application **142** has at first displayed the scanner selection dialog **625** (FIG. **6**D) and where the TWAIN driver selected by the user is set in the scanner selection field **621**. Accordingly, the device management control unit **902** constructs the reading (TWAIN) button **611**, which is a button for displaying the scanner selection dialog **625** (FIG. **6**D).

In step S**2412**, the device management control unit **902** determines whether the value of "active" is greater than "0". If it is determined that the value of "active" is greater than "0" (YES in step S**2412**), then the processing advances to step S**2413**. If it is determined that the value of "active" is not greater than "0" (NO in step S**2412**), then the processing advances to step S**2414**. In step S**2414**, the processing for constructing the content to be displayed on the device management screen ends.

In step S**2413**, the device management control unit **902** constructs the reading (TWAIN) button **611** for network connection by IHV native protocol according to the element <dm:name> **962** (FIG. **20**) and the element <dm:execute> **965** (FIG. **20**). Then, the processing advances to step S**2414**. In step S**2414**, the processing for constructing the content to be displayed on the device management screen ends. The processing instep S**2413** is executed in the case where an image can be read by the TWAIN driver **141** via network connection by IHV native protocol.

With the above-described configuration, the present exemplary embodiment can implement a peripheral apparatus control system configured to provide the function of the device appropriate in the environment of use by the user by utilizing the registry information set by the network utility **630** even if an MFP that does not include an external storage device and includes a printer and a scanner only, an MFP that does not include a printer and includes a scanner, a facsimile apparatus, and an external storage device only, or a single-function color scanner that does not include functions of a printer and an external storage device, is used as an example of the peripheral apparatus.

In the third exemplary embodiment described above, an MFP that does not include an external storage device and includes a printer and a scanner only, an MFP that does not include a printer and includes a scanner, a facsimile apparatus, and an external storage device only, or a single-function color scanner that does not include functions of a printer and an external storage device, is used as an example of the peripheral apparatus. In addition, the third exemplary embodiment is capable of providing the function of a device appropriate in the environment of use by the user by utilizing the registry information set by the network utility **630**.

In a fourth exemplary embodiment of the present invention, the above-described purpose of the present invention is achieved by executing a method for automatically identifying a device desired to be used by the user.

More specifically, in the present exemplary embodiment, in a case where an image can be read by the TWAIN driver, the following element <dm:function> is described in the device management and control file:

```
    <dm:function>
    <! -- Case where Image can Be Read by TWAIN Driver -->
    <dm:name xml:lang="en-US">Image Scan (TWAIN) </dm:name>
    <dm:execute>TWAINScan.exe "ABC Kmmn (TWAIN)" /devmng
</dm:execute>
    </dm:function>
```

In the present exemplary embodiment, the TWAIN application **142** generates a list of TWAIN drivers (scanners) that includes a text string as the TWAIN driver name, based on which the model name of the TWAIN driver (scanner) "ABC

Kmmn (TWAIN)", which is the first argument, can be identified, from among all the installed TWAIN drivers (scanners). In addition, the TWAIN application **142** selects an appropriate TWAIN driver (scanner) from among the TWAIN drivers (scanners). Furthermore, the TWAIN application **142** sets the selected TWAIN driver (scanner) in the scanner selection field **621** and launches the set TWAIN driver (scanner).

For a method executed by the TWAIN application **142** for selecting an appropriate TWAIN driver (scanner) from among the TWAIN drivers (scanners) included in the generated list, it is useful if the TWAIN application **142** executes a communication test on each TWAIN driver (scanner) and selects a TWAIN driver (scanner) available for normal communication. If no TWAIN driver (scanner) available for normal communication has been extracted, the TWAIN application **142** displays the scanner selection dialog **625** to allow the user to select a TWAIN driver (scanner).

If a plurality of TWAIN drivers (scanners) available for normal communication has been extracted, it is useful if the TWAIN application **142** prioritizes the communication speed, generates the priority order in order of USB connection and network connection by IHV native protocol, and selects a TWAIN driver (scanner) having a high priority order.

Processing according to the present exemplary embodiment will be described in detail below with reference to FIG. **25**. FIG. **25** is a flow chart illustrating an example of processing for launching a TWAIN application. A program of the processing illustrated in the flow chart of FIG. **25** is implemented by the CPU **204** by loading the program from the HDD **202** on the RAM **201**.

Referring to FIG. **25**, in step S**2501**, when the user presses (designates) the reading (TWAIN) button **611** via the device management screen **600**, the processing for launching the TWAIN application **142** starts. More specifically, in step S**2501**, the device management and control unit **902** included in the device management application **80** (FIG. **10**) transfers information included in the element "<dm:execute> TWAINScan.exe "ABCKmmn (TWAIN)"/devmng </dm:execute>" to the application control unit **907** via the link execution unit **903**.

In step S**2502**, the application control unit **907** acquires device designation information, which is described by using the TWAIN driver name that is the first argument, from the information transferred in step S**2501**. In step S**2503**, the application control unit **907** determines whether a TWAIN driver name that is the first argument (i.e., device designation information) is present.

If it is determined that a device has been designated (i.e., if it is determined that device designation information is present) (YES in step S**2503**), then the processing advances to step S**2504**. On the other hand, if it is determined that no device has been designated (i.e., if it is determined that no device designation information is present) (NO in step S**2503**), then the processing advances to step S**2505**.

In the present exemplary embodiment, a device is designated based on the TWAIN driver name that is the first argument, which is included in the element "<dm:execute> TWAINScan.exe "ABCKmmn (TWAIN)"/devmng </dm:execute>". Accordingly, in this case, the processing advances from step S**2503** to step S**2504**. On the other hand, if the TWAIN application **142** is launched without setting a first argument (NO in step S**2503**), then the processing advances from step S**2503** to step S**2505**.

In step S**2504**, based on a text string according to which the model name of the TWAIN driver "ABC Kmmn (TWAIN)" (or the scanner corresponding to the TWAIN driver) that is the first argument can be identified, the application control unit

907 searches for a TWAIN driver having a TWAIN driver name including the above-described text string from among all the installed TWAIN drivers. In addition, in step S**2504**, the application control unit **907** generates a list of TWAIN drivers that satisfy the above-described search condition.

If no TWAIN driver that satisfies the above-described search condition is extracted, the application control unit **907** generates a list including no TWAIN driver (i.e., a list including a null value). In step S**2509**, the application control unit **907** refers to the content of the list and determines whether any TWAIN driver has been extracted. If it is determined that any TWAIN driver has been extracted (YES in step S**2509**), then the processing advances to step S**2510**. On the other hand, if it is determined that no TWAIN driver has been extracted (NO in step S**2509**), then the processing advances to step S**2512**.

In step S**2510**, the application control unit **907** transmits a predetermined message to each scanner corresponding to each TWAIN driver. Furthermore, the application control unit **907** executes a communication test based on the content of a reply transmitted from each TWAIN driver. Furthermore, the application control unit **907** selects a TWAIN driver available for normal communication.

If a plurality of scanners available for normal communication has been extracted, then the application control unit **907** sets a priority order in order of USB connection and a connection via network by IHV native protocol in descending order of communication speed. In addition, the application control unit **907** selects a scanner (or a TWAIN driver corresponding to a scanner) having a high priority order.

In step S**2511**, the application control unit **907** searches for a device (scanner) available for normal communication. If the device (scanner) available for normal communication has been selected, the application control unit **907** sets the scanner (the TWAIN driver) designated based on the TWAIN driver name for the selected device (scanner) as the first argument. Then, the processing advances to step S**2513**.

On the other hand, if no device (scanner) available for normal communication has been extracted and if no device (scanner) has been selected (NO in step S**2511**), then the processing advances to step S**2512**. In step S**2512**, the application control unit **907** displays the scanner selection dialog **625** illustrated in FIG. **6**D. More specifically, when the user selects a TWAIN driver via the scanner selection field **626** and presses the OK button **627**, the application control unit **907** sets the scanner (TWAIN driver) designated based on the selected TWAIN driver name as the first argument. Then the processing advances to step S**2513**. In step S**2513**, the default device setting unit **908** sets the designated device (i.e., the scanner designated by using the TWAIN driver name) as the default device for the TWAIN application **142**. Then, the processing advances to step S**2514**.

In step S**2505**, the application control unit **907** transfers the information received from the device management and control unit **902** via the link execution unit **903** in step S**2501** to the launching source determination unit **906**. The information refers to the information described in the element "<dm:execute>TWAINScan.exe/devmng</dm:execute>", for which no first argument has been set designated.

The launching source determination unit **906** acquires a launching source that is a second argument. In step S**2506**, the launching source determination unit **906** determines whether the launching source is the device management screen or a source other than the device management screen. If it is determined that the launching source is the device management screen (i.e., the device management screen **600** in the present exemplary embodiment) (YES in step S**2506**), then the processing advances to step S2512. On the other hand, if it is determined that the launching source is a source other than the device management screen (NO in step S2506), then the processing advances to step S2507.

In the present exemplary embodiment, based on the second argument "/devmng" included in the element <dm:execute>TWAINScan.exe/devmng</dm:execute>, the device management screen **600** is designated as the launching source. Accordingly, in this case, the processing advances from step S**2506** to step S**2512**. On the other hand, if the TWAIN application **142** has been launched from a source other than the device management screen **600** (NO in step S**2506**), the second argument "/other" has been designated as the launching source. Accordingly, the processing advances from step S**2506** to step S**2507**.

In step S**2507**, the default device setting unit **908** acquires information about the default device for the OS via the application/DDI interface **84**. In the present exemplary embodiment, a "default device for the OS" refers to a device to which a default mark **502** has been assigned in the folder **500** (FIG. **5**A). Furthermore, in the present exemplary embodiment, because the device **501** (XYZ Defg) has been set as the default device, the default device setting unit **908** acquires the device N "XYZ Defg" in step S**2507**.

In step S**2508**, the default device setting unit **908** sets the device (driver) name as the device name of the default device for the TWAIN application **142** based on the default device for the OS acquired in step S**2507**. Then, the processing advances to step S**2514**. If the default device setting unit **908** does not extract an appropriate device (driver) name by referring to the default device for the OS acquired in step S**2507**, then the default device setting unit **908** executes the following processing. More specifically, the default device setting unit **908** sets the device (driver) name, which has been set when the TWAIN application **142** has been launched the last time as the default device.

In step S**2514**, the application control unit **907** displays the TWAIN application **142**. In step S**2515**, the processing for launching the TWAIN application ends. At this timing, the launched TWAIN application **142** is currently displayed in a state where the default device set in step S**2513** or S**2508** has been selected.

Furthermore, in the present exemplary embodiment, information about the default device for the TWAIN application **142** is stored on a memory area of **201**, which is managed by the TWAIN application **142**.

As described above, in the present exemplary embodiment, an element <dm:execute> for launching the TWAIN application **142** is described and included in the device management and control file by using a text string which enables specification of the model name of the TWAIN driver (scanner) as an argument. In addition, in the present exemplary embodiment, the TWAIN application **142** selects and launches an appropriate TWAIN driver (scanner) based on the text string as described above. With the above-described configuration, the present exemplary embodiment can implement a peripheral apparatus control system configured to provide the function of a device appropriate in the environment of use by the user.

The present invention can also be implemented by executing processing according to a fifth exemplary embodiment of the present invention. More specifically, the present invention can also be achieved by providing a system or an apparatus with a storage medium storing program code of software implementing the functions of the embodiments and by reading and executing the program code stored in the storage medium with a computer of the system or the apparatus (a CPU or a micro processing unit (MPU)).

In each of the exemplary embodiments of the present invention described above, the device management application **80** illustrated in FIG. **10** is used as an example of the application. However, the present invention is not limited to this. More specifically, an aspect of the present invention can be effectively implemented by an arbitrary application having a function similar to the function of each exemplary embodiment of the present invention.

In each exemplary embodiment of the present invention described above, the TWAIN application **142** illustrated in FIGS. **6**B and **10** is used as an example of the application. However, the present invention is not limited to this. More specifically, the present invention can also be effectively implemented by an arbitrary application having a function similar to the function of the above-described exemplary embodiment of the present invention, such as an application for printing an image (document image).

In addition, in each of the exemplary embodiments of the present invention described above, a PC is used as an example of the information processing apparatus. However, the present invention is not limited to this. More specifically, an arbitrarily selected information processing apparatus (terminal), which can be used in a manner similar to the manner described above, such as a digital versatile disc (DVD) player, a gaming machine, a set-top box, or an Internet appliances, can also effectively implement the present invention.

Furthermore, in each of the exemplary embodiments of the present invention described above, an MFP is used as an example of the peripheral apparatus. However, the present invention is not limited to this. More specifically, the present invention can be effectively implemented by using any of a copying machine, a facsimile apparatus, a scanner, or a digital camera or an apparatus having a plurality of functions including a combination of the functions of the above-described apparatuses as the peripheral apparatus.

Moreover, in each exemplary embodiment of the present invention, an OS equivalent to Windows® 7 is used as an example of the OS. However, the present invention is not limited to this. More specifically, an arbitrary OS can be used to implement an aspect of the present invention.

In addition, in each exemplary embodiment of the present invention, Ethernet is used as an example of the configuration of the network **4**. However, the present invention is not limited to this. More specifically, another arbitrary network having a different configuration can be employed to implement an aspect of the present invention.

Furthermore, in each exemplary embodiment of the present invention, Ethernet is used as an example of the interface between the PC **1**, and the MFPs **3** and **7**. However, the present invention is not limited to this. More specifically, it is also useful if a different other arbitrary interface is used to implement an aspect of the present invention, such as a wireless LAN, Institute of Electrical and Electronic Engineers (IEEE) 1394, Bluetooth, or USB.

In addition, in each of the exemplary embodiments of the present invention described above, WSD is used as an example of the protocol used for the web service. However, the present invention is not limited to this. More specifically, a different other arbitrary protocol, such as a protocol unique to an IHV, can be used to effectively implement an aspect of the present invention.

Furthermore, in each exemplary embodiment of the present invention, when the user presses the reading (TWAIN) button **611** via the device management screen **600**, the TWAIN application **142** is launched in a state where an appropriate device (driver) has been set. However, the present invention is not limited to this. More specifically, it is also useful if an appropriate device (driver) name is designated and an arbitrary application is executed by launching the arbitrary application via the device management screen, which includes a link to a specific web site, to provide a service there.

With the above-described configuration, each exemplary embodiment of the present invention can provide a device management screen capable of providing an appropriate display and function according to the environment of use of the user. In addition, according to each exemplary embodiment of the present invention having the above-described configuration, when the user launches an a plurality of to utilize a function provided by the peripheral apparatus, the user is allowed to appropriately and securely utilize the function provided by the peripheral apparatus because the display and the function of the application is automatically caused to become optimum according to the environment of use of the user.

Therefore, with the above-described configuration, each exemplary embodiment of the present invention can provide the user with an appropriate function of the device according to the environment of use of the user.

Furthermore, the present invention is not limited to a specific exemplary embodiment described above. More specifically, the present invention can be arbitrarily modified or altered within the scope of the present invention described in claims thereof.

While the present invention has been described with reference to exemplary embodiments, it is to be understood that the invention is not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all modifications, equivalent structures, and functions.

This application claims priority from Japanese Patent Application No. 2009-201853 filed Sep. 1, 2009, and No. 2009-285354 filed Dec. 16, 2009, which are hereby incorporated by reference herein in their entirety.

What is claimed is:

1. An information processing apparatus capable of connecting with a device, the information processing apparatus comprising:

a management unit configured to manage the device; and

a network utility configured to monitor a status of the device,

wherein the management unit displays a management screen according to control data,

the management unit confirms whether a storage function of the device is available,

the management unit displays a launching object for which first information of a TWAIN driver for USB connection is set in the management screen, according to the control data, in a case where it is confirmed that the storage function of the device is available,

a scan application is launched in a state where the TWAIN driver for USB connection is selected, in a case where the launching object for which the first information is set is selected,

the network utility monitors the status of the device, in a case where it is not confirmed that the storage function of the device is available,

the management unit displays a launching object, for which second information of a TWAIN driver for network connection is set, in the management screen, according to the control data, in a case where the device is determined to be online by the network utility, and

a scan application is launched in a state where the TWAIN driver for network connection is selected, in a case where the launching object for which the second information is set is selected.

2. The information processing apparatus according to claim **1**, wherein the managing unit determines that a storage function of the device is available, in a case where the device has been connected to the information processing apparatus via a USB interface and a storage class driver has been installed.

3. The information processing apparatus according to claim **1**, wherein the managing unit displays a launching object, for which information of the TWAIN driver for network connection using an independent hardware vendor (IHV) native protocol is set as the second information, in the management screen, according to the control data, in a case where the device is online and it is not confirmed that the storage function of the device is available.

4. The information processing apparatus according to claim **1**, wherein the scan application is launched in a state where a default device of an OS is selected, in a case where the launching source of the scan application is a portion other than the management screen.

5. A method executed by an information processing apparatus capable of connecting with a device comprising:

displaying a management screen according to control data;

confirming whether a storage function of the device is available;

displaying a launching object for which first information of a TWAIN driver for USB connection is set in the management screen, according to the control data, in a case where it is confirmed that the storage function of the device is available;

launching a scan application in a state where the TWAIN driver for USB connection is selected, in a case where the launching object for which the first information is set is selected;

monitoring a status of the device, in a case where it is not confirmed that the storage function of the device is available;

displaying a launching object, for which second information of a TWAIN driver for network connection is set, in the management screen, according to the control data, in a case where the device is determined to be online; and

launching a scan application in a state where the TWAIN driver for network connection is selected, in a case where the launching object for which the second information is set is selected.

6. The method according to claim **5**, further comprising determining that a storage function of the device is available, in a case where the device has been connected to the information processing apparatus via a USB interface and a storage class driver has been installed.

7. The method according to claim **5**, wherein the managing screen displays a launching object, for which information of the TWAIN driver for network connection using an independent hardware vendor (IHV) native protocol is set as the second information, in the management screen, according to the control data, in a case where the device is online and it is not confirmed that the storage function of the device is available.

8. The method according to claim **5**, wherein the scan application is launched in a state where a default device of an OS is selected, in a case where the launching source of the scan application is a portion other than the management screen.

9. A non-transitory computer readable medium having computer-executable instructions stored thereon which, when executed by a computer, cause the computer to function as an information processing apparatus capable of connecting with a device, the information processing device executing a method comprising:

displaying a management screen according to control data;

confirming whether a storage function of the device is available;

displaying a launching object for which first information of a TWAIN driver for USB connection is set in the management screen, according to the control data, in a case where it is confirmed that the storage function of the device is available;

launching a scan application in a state where the TWAIN driver for USB connection is selected, in a case where the launching object for which the first information is set is selected;

monitoring a status of the device, in a case where it is not confirmed that the storage function of the device is available;

displaying a launching object, for which second information of a TWAIN driver for network connection is set, in the management screen, according to the control data, in a case where the device is determined to be online by a network utility; and

launching a scan application in a state where the TWAIN driver for network connection is selected, in a case where the launching object for which the second information is set is selected.

10. The non-transitory computer readable medium according to claim **9**, further comprising determining that a storage function of the device is available, in a case where the device has been connected to the information processing apparatus via a USB interface and a storage class driver has been installed.

11. The non-transitory computer readable medium according to claim **9**, wherein the managing screen displays a launching object, for which information of the TWAIN driver for network connection using an independent hardware vendor (IHV) native protocol is set as the second information, in the management screen, according to the control data, in a case where the device is online and it is not confirmed that the storage function of the device is available.

12. The non-transitory computer readable medium according to claim **9**, wherein the scan application is launched in a state where a default device of an OS is selected, in a case where the launching source of the scan application is a portion other than the management screen.

* * * * *